Community forestry and environmental literacy in northern Thailand:
Towards collaborative natural resource management and conservation

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Academic Dissertation

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ABSTRACT

Conservation and sustainable management of tropical forests needs a holistic approach: in addition to ecological concerns, socio-economic issues including cultural aspects must be taken into consideration. An ability to adapt practices is a key to successful collaborative natural resource management. Achieving this requires local participation and understanding of local conceptions of their environment. However, collaborative management faces problems of differing views of forest utilisation and protection, particularly between government and local people. This study looked for answers to these questions in Thailand's context.

Northern uplands of Thailand are the home of forest reserves and several ethnic minority groups commonly referred to as hill tribes. These ethnic groups are widely regarded as differing from each other and from the Thai in their valuations of the forests. This has been considered as a constraint for sustainable community-based forest management. The overall purpose of this study was to grasp a regional view of an ethnically diverse forested area and to elicit prospects to develop community forestry for conservation purposes and for securing people's livelihood. Conservation was a central goal of management as the forests in the area were largely designated as protected.

The aim of this study was to look at forest management from the community point of view in an upland area of northern Thailand. Local perceptions, objectives, values and practices of forest management, under the umbrella of the concept environmental literacy, were examined, as well as the effects of forest policy on communities' management goals and activities. The environmental literacy concept was used as an analytical tool to look at people's views, interests and motivation in a broader scope than just investigating their knowledge on the forest.

The material for this study was gathered in six villages in Chiang Mai Province during three fieldwork periods between 2002 and 2004. In addition, other villages were visited for a broader view. The study villages were selected on the basis of their ethnic group and location in relation to the forest and strictly protected national parks. The ethnic groups included in the study were the Karen, Hmong and Lawa, which belong to the so called hill tribes, and the Thai. The interviewees were selected to have an equal number of men and women, people of different ages and varying level of education.

The principal method used was interviewing; semi-structured interviews with open-ended questions (totalling 73 in the selected villages) and thematic focus group interviews (19 in the study villages) conducted in the villages formed the primary material. Unstructured interviews and observation provided complementary material. Furthermore, officials at district, regional and national levels, workers of non-governmental organisations, and academics were interviewed, and some data were gathered from the pupils of a local school. All interviews in the villages and some of the other interviews were carried out with the help of an interpreter. Altogether 167 interviews were conducted.

The results showed that motivation for protecting the forests existed among each ethnic group studied. This was a result of culture and traditions evolved in the forest environment but also of a need to adapt to a changed situation and environment and outside pressures. The consequences of deforestation were widely agreed on in the villages, and the impact of socio-economic changes on the forests and livelihood was also recognised. The forest was regarded as a source of livelihood providing land, products and services essential to the people inhabiting rural uplands. Many products, particularly for food, medicinal purposes, firewood and construction, were collected from the forest. The significance of forest products, however, was decreasing due to decreased availability and increased commercial farming taking people's time and bringing them increasingly involved in cash economy. Forest products could presently provide no sustainable source of income for the villagers.

The villagers in each ethnic group regarded forest conservation as important; the significance of the forest for water, pleasant weather, wood and habitat for people and animals was emphasised. Traditions of forest protection were often referred to in each village. Fire control, cooperation, reforestation, separation of protected and utilisable areas, and rules were viewed as central for conservation. For the villagers, however, conservation meant sustainable use, whereas the government has tended to prefer strict restrictions of forest resource use. Thus, disputes had arisen. Some conflicts between the villages, particularly between uplanders and lowlanders, had also emerged, but cooperation between the villages was more dominant than conflict.

Changes in upland agriculture that had occurred and were going on, together with an increasingly active forest conservation policy, had had a major importance on forest management in the communities and posed a great challenge of adaptation to the local people. Moreover, despite the efforts of decentralisation, centralised decision-making was dominant and distrust between officials and villagers appeared. Furthermore, stereotypic notions of upland minorities still affect policies. The results indicated that the heterogeneity of forest dwellers, although it has to be recognised, should not be overemphasised: ethnic diversity can be considered as no major obstacle for successful community forestry. In addition to focussing on conservation, a focus on people's livelihood is crucial. Collaborative management is particularly important in protected areas. Forest management needs more positive incentives and increased dialogue.

Keywords: northern Thailand, upland ethnic minorities, Karen, Hmong, Lawa, environmental literacy, community forestry, conservation

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PREFACE

This study was carried out at the Viikki Tropical Resources Institute (VITRI), at first under the project "Environmental Literacy – Perceiving Nature in Cultural and Historical Context" of the Academy of Finland and then within the Finnish Graduate School for Development Studies. Three departments of the University of Helsinki have been involved: Department of Social Science History, Institute of Development Studies and Department of Forest Ecology in which VITRI belongs. Sasakawa Foundation granted a Young Fellow Grant at the beginning of my studies. Field trips, crucial for my work, were funded by Emil Aaltonen Foundation, Department of Social Science History, Heikki and Hilma Honkanen Foundation, and the Finnish Cultural Foundation. My participation in international conferences and courses to present my study and meet fellow researchers has been supported by Chancellor's travel grants, NorFa (NordForsk), and Finnish Konkordia Fund.

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Minna Hares
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GLOSSARY

Amphoe	District
Ban	Village (also home, house, place)
CARE/ Care	Non-governmental organisation; CARE Thailand is a member of CARE International
CBD	Convention on Biological Diversity
Chao khao	Hill tribe
Danced	Danish Cooperation for Environment and Development
Dong seng	Traditional Hmong ceremony for forest spirits (*Teev Ntoo Xeeb*)
FAO	Food and Agriculture Organization of the United Nations
FIO	Forestry Industry Organization
Hmong	Upland ethnic group in northern Thailand (the Thai call the group Meo)
ICRAF	World Agroforestry Centre
IMPECT	Inter Mountain Peoples Education and Culture in Thailand Association
Karen	Upland ethnic group in northern Thailand (the Thai call the group Kariang)
Khon muang	Lowland Thai of northern Thailand
Lawa	Upland ethnic group in northern Thailand (the Thai call the group Lua)
Matayom	Six higher grades in the Thai school system
MCPFE	Ministerial Conference on the Protection of Forests in Europe
NGO	Non-governmental organisation
Pratom	Six lower grades in the Thai school system
PO	People's organisation
Rai	Unit of measurement for area used in Thailand, 0.16 ha
Rai lu'an loy	Term used for swiddening; 'drifting swidden field'
RFD	Royal Forest Department of Thailand
SFM	Sustainable Forest Management
STK	Land Certificate Program in Thailand (quite similar to the Forest Village Program)
Tambon	Sub-district
TAO	Tambon Administration Organisation
UNCED	United Nations Conference on Environment and Development
USAID	US Agency for International Development

1. INTRODUCTION

1.1 Conservation as a goal of forest management

The demand for the conservation of tropical forests has often started with global concerns of environment and biodiversity. In extreme cases it has been claimed that plants and animals have been protected for urban elites (Ghimire & Pimbert 1997, 4–8). However, conservation, to be successful, should first take into consideration the people who live in or adjacent to the forests. A dilemma appears: how to protect forests and their biodiversity and at the same time ensure the local people's livelihood. Various approaches have been taken to tackle this problem: common property, political ecology, environmental ethics, environmental history, and knowledge of resource users (Berkes 2004). An approach that starts from the resource users' knowledge is applied in the present study. Furthermore, it should be taken into account that in addition to the local people many other stakeholders have interests in and effect on the state and fate of the forests. Instead of strict conservation, although necessary to some extent, the assumption is that sustainable use is in many cases a more successful approach (Schwartzman et al. 2000).

Human activities have often been viewed as harmful to tropical forest biodiversity, which has lead to an ideal of strict nature reserves protected from human interference (Redford 1992; Peres & Terborgh 1995; Bruner et al. 2001). Restrictions and exclusion of people from protected areas, however, easily leads to marginalisation of forest dwellers. Moreover, local knowledge may be lost as a result, and in some cases even the local biodiversity may be impoverished. Marginalisation can also cause conflicts that potentially threat the conservation goals. (Ghimire & Pimbert 1997, 13–16). Linking biodiversity conservation and sustainable livelihoods can be regarded as one means to counteract this process of marginalisation, in particular, among vulnerable groups such as ethnic minorities. This includes highlighting the links between biodiversity, agriculture and local knowledge as well as recognising the local–global connections. (Horta 2000, 187–90).

Along with the recognition that forests are a source of livelihood for millions of people, particularly in the tropics, a paradigm shift seems to have been taking place from uninhabited protected areas (where human presence is equalled to destruction) towards people-centred conservation. The new paradigm puts more emphasis on the role of forests in poverty alleviation and rural development. In addition, such issues as rehabilitation and restoration of degraded areas, administrative integration of forestry sector with social and economic sectors, rural-urban interaction and conflict resolution are increasingly highlighted. (Mery et al. 2005, 14–17). In Asia in general, the focus in forestry has shifted towards conservation, increased role of local people, plantations rather than natural forests as timber sources, and tightened control of illegal logging (Liu et al. 2005). The change of forestry paradigms is a gradual process regarding its impact on management decisions. The first step in people-centred conservation would be to find a means to reconcile stakeholders' different views, interests and objectives (Brown 2003).

Forest management has now come across requirements to respond to the new challenges of integrating broader societal concerns and dealing with more complex issues, and focussing on conservation and sustainable use. Concerns of poverty, equity, and loss of forest goods and services, for example, have raised a requirement for a broader landscape approach (Mery et al. 2005, 14–15). Thus, the need for creating more comprehensive forest management systems has emerged because of broadened demands of management objectives at all levels from local to global, increased assessment of practices, decentralisation processes, and globalisation. Thus, the trend is to broaden the goals from production to multiple functions. Recent strategies in attempting to redirect forest management practices towards broader approach include sustainable forest management (SFM), and a widened strategy called ecosystem approach. Based on the framework of the Convention on Biological Diversity (CBD), the ecosystem approach is regarded to include SFM but it is defined more broadly and actually includes several approaches and also other

ecosystems than forests. The ecosystem approach remains unbound to any specific operational approach and it is focussed on increased integration of societal concerns and management for a wide range of products and services. (Sayer & Maginnis 2005b, 2–7).

Conservation efforts basically include seeking for best management practices that would be appropriate in socio-economic and cultural terms and adaptive to various natural conditions (Brown 2003). Finding them provides research to elicit the values of local people regarding forest resources and to investigate the ways of carrying out such research (Lawrence et al. 2000, 112). It is an important task to look at the new approaches to forest management by working in concert with all stakeholders, not least with the local men and women to find the best practices (Colfer et al. 1997, 79, 157–8). To be sustainable, the management needs to be adaptive, and adaptive management requires involvement of local people.

1.2 Sustainable Forest Management as an instrument of the Ecosystem Approach

It has become evident that total conservation or planting trees are alone inadequate solutions for deforestation and degradation problems. Therefore, a more comprehensive approach is sought (Oltheten 1995). The recent trends in forest management discussion highlighting sustainable forest management (as it is defined in recent studies) or, in a broader examination, the ecosystem approach, provide instruments for a more comprehensive contemplation. As illustrated in Figure 1, community-based management can be assumed to be a basic unit in attempts to achieve a wider set of objectives that have been introduced to forestry.

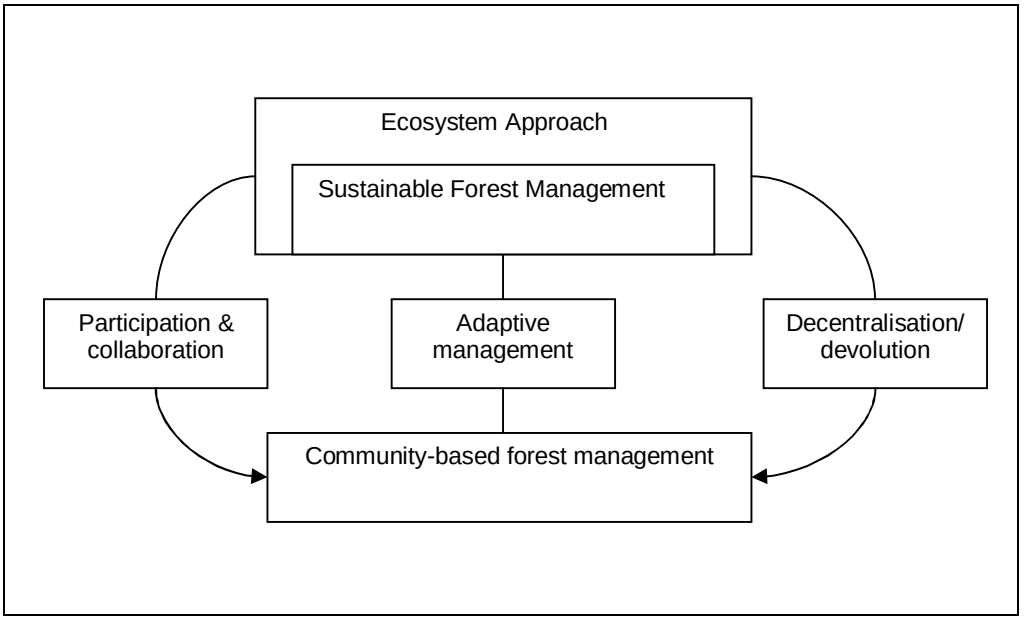

Figure 1. Sustainable forest management can be taken to the community level through participation, collaboration and decentralisation. An adaptive approach to socially and environmentally diverse contexts is required to achieve sustainability. It is a way for conservation through management.

This study focuses on forest management[1] in communities, putting a particular emphasis on its integration with conservation and livelihood goals. As even the remotest communities are today affiliated with a larger society, a central aspect of this study is to view the political framework from the community forestry point of view. However, before focussing the attention to the local level, a global forestry discussion on incorporation of social objectives into natural resource management is briefly outlined.

From sustained yield to sustainable forest management

Forest management tended previously to focus on wood production but other aspects are now increasingly incorporated. 'Sustained yield' was a prevailing trend until the turn of the 1980s and 1990s when a new trend of sustainable forest management (SFM) took over. It had its foundation on sustained yield but covered a wider range of forest products and services. (Luckert & Williamson 2005, 356). The concept sustainable forest management is based on the UNCED (United Nations Conference on Environment and Development) Forest Principles, which state that "[f]orest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations" (UNCED 1992). International efforts to advance the implementation of Forest Principles and SFM have taken place within the Intergovernmental Panel on Forests (1995–97), Intergovernmental Forum on Forests (1997–2000) and United Nations Forum on Forests (UNFF, since 2000). A joint effort to promote SFM and to seek practical solutions for its implementation is has been the establishment of the Collaborative Partnership on Forests, which has fourteen members, including several United Nations organisations and other central forest organisations. (FAO 2005b, 57–61).

SFM is regarded as a concept difficult to define and it still lacks a generally acknowledged definition (Wang 2004). In 1992, ITTO (The International Tropical Timber Organization) defined sustainable forest management by using silvicultural, institutional and economic criteria (ITTO 1992). At the beginning, thus, the linkage to wider societal aspects was lacking. The definition for sustainable forest management most commonly used, however, is the one of the Ministerial Conference on the Protection of Forests in Europe (MCPFE, in 1993), which includes social functions: "The stewardship and use of forests and forest land in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national and global levels, and that does not cause damage to other ecosystems" (IUFRO 2005, 43).

The recent definitions of SFM are characterised by inclusion of the various stakeholders' views in the determination of sustainability, recognition of the diversity of forest products and services, balancing of diverse objectives by making trade-offs, and definition of the temporal and spatial context (Contreras-Hermosilla 1999). Apart from the socio-economic and conservation objectives, timber production is also included in SFM, and Reduced Impact Logging[2] remains its central element. However, instead of being centred on timber, SFM integrates a broader variety of societal and ecological goals than 'conventional forest management', or 'sustained yield' forestry. Furthermore, SFM is trans-disciplinary rather than disciplinary and tends to stress heterogeneity. (Wang 2004).

[1] Forest management is in this study understood in a broad sense containing any purposeful activities in the forest, referring also to practices for conservation and enhancement of forest resources and the diverse ways to utilise forest products and services. This definition also refers to the process of decision-making and control on the execution (see e.g. Umans 1993, 10).

[2] Reduced Impact Logging (RIL) is "a collective term that refers to the use of scientific and engineering principles, in combination with education and training, to improve the application of labour, equipment and operating methods in the harvesting of industrial timber" (Dykstra 2002). It reduces damage to residual stands, minimises the area of skid trails and the area damaged by road construction, causes less overall damage to the site and reduces canopy opening (Killman et al. 2002).

To assess SFM, sets of criteria and indicators (C&I) have been developed: The criteria aid in judging the sustainability of the systems, and corresponding indicators have been defined to help in monitoring the impacts of operations. This defining process started at United Nations Conference for Environment and Development in Rio de Janeiro 1992 and continued in FAO (Food and Agriculture Organization of the United Nations) and ITTO meeting in 1995, the Intergovernmental Seminar on Criteria and Indicators in Helsinki in 1996, and in several other meetings after them. Altogether, nine major processes exist at present. These international processes and national governments have produced several sets of criteria and indicators but to date no globally agreed one exists. (Castañeda 2000, 34). Nevertheless, some widely approved general thematic fields of SFM can be listed (Castañeda 2000, 34–36; Raison et al. 2001; ITTO 2005, 8):

- Extent of forest resources (land covered by natural and planted forest, range of forest types and integrity of the forests);
- Biological diversity (genetic, species and ecosystem diversity);
- Forest health and vitality (assessment of ecosystem processes and forest condition and the extent of disturbance);
- Productive functions of the forest (including site potential and management, non-wood and wood produces);
- Protective functions of the forest (including soil and water values and carbon balance);
- Socio-economic benefits and needs (at various scales; containing cultural aspects and the level of participation);
- Legal, policy and institutional framework (institutional requirements for sustainability, including political commitment).

As the regional and local conditions are diverse, the needs for criteria and indicators vary. Therefore, a forest management unit level approach has been created. (Castañeda 2000, 35). On the other hand, a question of the need for harmonisation of the various criteria and indicators has arisen. However, when the variation is based on differences in socio-economic or ecological conditions, harmonisation could be disadvantageous. In context, when variation appears because of differences in the capacity, for example, to plan, implement and monitor, harmonisation could be helpful. (Holvoet & Muys 2004, 121). The Collaborative Partnership on Forests (CPF), for example, has actively promoted harmonisation of definitions (FAO 2005b, 59–60). For the tropics, ITTO has attempted harmonisation and has recently revised its own criteria and indicators based on the themes above. These revised criteria and indicators are expected to provide a framework within which national and forest management unit level criteria and indicators of sustainability can be formed. The purpose is that revisions and redefinitions should form a continuous process. (ITTO 2005).

Widening the angle: the ecosystem approach

The ecosystem approach is the primary framework in putting the principles of the Convention on Biological Diversity (CBD) into practice and is viewed as complementary to the 'sustainable livelihoods approach' (CBD 2003).[3] The actual principles and guidelines of the ecosystem approach were outlined in the CBD Fifth Conference of Parties in 2000. During the past decade, the ecosystem approach concept and its applications have evolved and been specified in various meetings and reports. (FAO 2003; Hartje 2003, 30; Stadler 2003, 25).

The CBD defines the 'Ecosystem Approach' as "a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way", and it "recognizes that humans, with their cultural diversity, are an integral component of many ecosystems". The ecosystem approach, which actually refers to multiple

[3] Other similar approaches aiming to better integrate and accomodate multiple goals of production, protection and livelihood in natural resource management, such as the global initiative of 'Forest Landscape Restoration' for deforested or degraded areas or 'Multidisciplinary Landscape Assessment' of CIFOR (Center for International Forestry Research), have been introduced.

strategies, urges on the use of adaptive management practices that include “the diversity of social and cultural factors affecting natural resource use”. (CBD Decision VII/11). It attempts not only to balance conservation, production and use of forest resources but also to integrate these objectives (Sayer & Maginnis 2005b, 10).

Ecosystem approaches in forest management, comprising multiple strategies, are closely related to sustainable forest management. They form a broadened approach as compared to SFM in terms of management and participation objectives but utilise the tools and methodologies of SFM. The ecosystem approach can be regarded as complementary to SFM but having a wider conceptual framework: it increasingly puts an emphasis on locally applied systems, and pays attention to change and to the goals of equity and sustainability. (Sayer & Maginnis 2005b). Anyhow, sustainable forest management can be regarded as a means to apply the ecosystem approach to forest environments. Tools of SFM, particularly the criteria and indicators, could help to implement the ecosystem approach. The ways to integrate SFM and ecosystem approach are looked for. Attempts for harmonisation require SFM to strengthen cross-sectoral integration and expand its scope from the forest management unit and national level also to the landscape level. The ecosystem approach needs to utilise the concrete tools of SFM to become feasible. (CBD 2003; CBD Decision VII/11).

The central characteristics of the ecosystems approach are (CBD Decision VII/11):

- Effects on other ecosystems are taken into consideration;
- The economic context is taken into account with emphasis on conservation, and sustainable-use ecosystem services are maintained;
- Targets are for long-term;
- Inevitability of changes is recognised;
- All forms of information are considered;
- All relevant sectors of society and scientific disciplines are involved;
- Conservation and use are balanced and integrated.

Furthermore, instead of a strict division of areas into protected and non-protected, the ecosystem approach implies that the flexibility of the systems can be increased and the balance between conservation values and usage improved (Korn et al. 2003, 8–9). In case studies, the ecosystem approach has proved as highly flexible. However, this approach has many challenges at the practical level, for instance, in meeting the demand of recognising inter-ecosystem linkages. (Smith & Maltby 2001, 10, 21).

Within the ecosystem approach framework it is emphasised that management objectives are a societal choice. Decentralisation to the lowest appropriate level is pointed out (CBD Decision VII/11). It should be noted, though, that the lowest appropriate level differs from case to case and according to problems to be addressed; it can be as low as a farm, but to better respond to the objectives of CBD – which may require a general view of a larger area – it may refer to, for example, trans-national regions. Recognition of existing institutional and legal structures is a starting point in defining appropriate scales and mechanisms of management. (Smith & Maltby 2001, 20).

Combined top-down and bottom-up way of action could best serve the ecosystem approach (Smith & Maltby 2001, 20). This represents new thinking of participation, which, instead of focussing merely on the bottom-up approach, has adopted a wider angle that intends to embrace all relevant stakeholders (Smith & Maltby 2003, 31–32). Although the emphasis of forest management in the ecosystems approach is on the local level, wider societal interests at regional, national and even global levels are also to be involved. While stressing the involvement of all relevant stakeholders representing different levels, the ecosystem approach underlines the involvement of indigenous peoples and other local communities as important stakeholders. (Korn et al. 2003, 8–10). The emphasis of participation in the ecosystem approach is on learning together, and the aim is balanced use of scientific and local knowledge and practices (Sayer & Maginnis 2005b, 10). Integration of various knowledge bases may, nevertheless, be difficult, and the stakeholders’ indicators for sustainability may vary (Purnomo 2003, 89). A further challenge, for example, is that the time-scales of stakeholders may be different (Smith & Maltby 2001, 22).

The ecosystem approach has been criticised for being too vague and inadequately defined. The critics regard its practical guidelines as insufficient. The critics claim for solutions on how to deal with divergent objectives and different emphases and how to ensure institutional capability for implementation. (Hartje 2003, 31). On the other hand, the ecosystem approach is holistic, and its advantage in forest management is that it can better respond to the challenges of the diverse existing conditions, for instance, in including agro-ecosystems and landscapes with fragmented forest. It can also better overcome the problems of different definitions of forest in local-level management because it becomes insignificant whether or not an area is defined as forest.

Adaptive management systems

To fulfil the criteria of sustainable forest management, in particular regarding to biodiversity and socio-economic needs, new systems are sought in many places to find "responsive, adaptive and resilient" solutions (Folke et al. 2000, 414). All these efforts are characterised by the emphasis on local people's involvement in forest management, and a myriad of terms describing the new adaptive approaches, such as integrated natural resource management, multifunctional forestry and ecoregional management, have been created. An all-inclusive concept has been tried to find; for instance participatory forest management has been suggested to cover all the terms ranging from joint forest management to community-based natural resource management (White & Mustalahti 2004, 22). Many of the terms are used interchangeably and defined similarly, but sometimes differences appear, for instance, in the level of state involvement in management. They all, however, share the aim for sustainable use and management of natural resources and emphasise flexibility and adaptability (Yaffee 1999; Schlaepfer et al. 2004). All in all, the plurality of the terms and approaches seems to reflect an existing demand to create integrated systems that increasingly reckon with both societal and ecological aspects.

A concept that could be regarded as a collective one for many approaches is adaptive management. It has its basis on the purpose to view management objectives within a wide socio-economic and environmental framework that is constantly changing. Adaptive management recognises the variety of possible managers and covers the whole diversity of tenure arrangements of management systems. It is often further specified by including attributes 'co-' or 'collaborative', thus highlighting the participation of various stakeholders, usually referring to cooperation with local communities and government organisations. Adaptive management systems are characterised by factors that help to keep them capable of adapting, influencing factors causing change and buffering harmful changes. These factors include extensive information flows within and outside the system, interaction and participation, constant learning, focus on local capacity and control, and diversity of inputs. (Bass 2001, 30).

The concept adaptive management was taken to use already in the 1970s. At the end of the 1970s, C. S. Holling developed an idea of adaptive environmental management that would integrate environmental, economic and social understanding (Holling 1980). However, involving local people and their environmental literacy, which are both central for a management system to be truly adaptive, has been commonly neglected until recently (Armitage 2003; Murray & Marmorek 2003). Despite inadequate implementation in many cases, the principles of adaptive management are now widely acknowledged and the concept is used also in CBD decisions, where its significance in fulfilling the goals of ecosystem approach is stressed (CBD Decision VII/11). It has been commonly agreed that adaptive management needs to be taken as a guideline in operationalization of ecosystem approach (Smith & Maltby 2003, 40).

Adaptive is a description used to emphasise the need of a management system to be dynamic, flexible and able to respond to changing conditions, even the unexpected ones. The definition of adaptive management systems, which are characterised by continuous learning

and adaptation to altering socio-economic and ecological systems, contains application of local environmental literacy. (Armitage 2003, 79–80). Inclusion of local environmental literacy aims at achieving improved resilience and sustainability of management practices as local institutions can respond to changes faster and more flexibly than central ones. Local practices of monitoring, protection of certain areas and species, temporal restrictions of harvest, management of multiple species, succession and landscape patchiness, resource rotation, facilitating renewal, and responding to unpredictable changes, when based on environmental literacy, are playing an important role in adaptive management. Furthermore, social mechanisms including generation, integration and transmission of environmental literacy; local institutions, such as regulations, sanctions, knowledgeable people and community decision-making; and cultural mechanisms, such as rituals and ceremonies and cultural values, are maintaining the systems of management. (Folke et al. 2000, 417–27). Adaptive management thus emphasises the significance of decentralised approach. However, too decentralised management may impede feedback between areas or user groups (Folke et al. 2000, 432).

Adaptation in management systems is needed when changes take place in resources, natural environment, social conditions, economic conditions, livelihood, institutions, policies, or external factors. When the changes occur, different modes of adaptation can be applied (modified from Nayak 2003):

- Change in management strategies;
- Institutional rearrangements;
- Promotion of conservation;
- Support for livelihood needs;
- Negotiations (with officials, other outsiders, communities);
- Cooperation.

The strategies for adaptation carried out at the local level are not necessarily, however, conservation- oriented or ecologically sustainable in the long term. Meanwhile, adaptive management systems developed for forestry strive for navigating change in a sustainable manner. Their aim is even to benefit from change or at least reduce and cope with uncertainty (Holling 1980, 2).

Conditions for an approach that involves local people to be successful include that local institutions exist and they are capable enough, local access and control are ensured, opportunities for equal participation are provided, local environmental literacy is integrated, and equal distribution of benefits is secured (Oltheten 1995). Involvement of all stakeholders contains a challenge how to accommodate multiple interests. Methods for that aim need to concentrate on three starting points for action: definition of interests, communication and coordination. Stakeholder analysis can help in defining the interests, but it should be accompanied by identification of interests through actions and factors that affect changes of interests, and a linkage to social contexts. Central questions are who defines the interests and which and whose interests are represented in a negotiation process. Communication requires that concepts and definitions are agreed upon. Furthermore, a place and facilitator of negotiations need to be accepted by the parties. For coordination methods of negotiation, institutions to facilitate and manage coordination and the level of self-governance are to be determined. Usually, a variety of local institutions have the best potential for coordination. All in all, accommodating a plurality of interests succeeds best with a joint learning process. (Wollenberg et al. 2001).

1.3 Why local views of forest management count?

With the loss of forest cover the livelihood of the people living in or adjacent to forest areas is threatened. However, forest dwellers are not just passive victims of deforestation – neither can they alone be blamed for clearance of forest (Wiersum & Persoon 2000). Although this means that the problem of deforestation cannot be solved within forest dwellers alone, on the other hand, it indicates that it is essential to seek for solutions at all levels. It is commonly assumed that local people are active managers of their environment, which they are well

familiar with, and thus have a potential in finding local solutions. Even more important, however, is to acknowledge that if management systems are appropriate in local socio-economic and cultural terms, they have greater potential to achieve the conservation goals. Thus, local knowledge, priorities and practices related to forest management need to be studied to elicit the existing capacity, attitudes and motivation of forest communities for conservation and sustainable use of the forests.

A people-centred approach as a recognised instrument of forestry seems to have come to stay. Furthermore, it is widely acknowledged that the creation of new natural resource management systems requires research starting with the stakeholders' views and objectives and local practices. Tools are needed to define local perspectives and interests including recognition of their heterogeneity and their linkage to a wider picture. Study of the dynamism of local knowledge, or environmental literacy which is the term preferred in this study, and of factors affecting to change is now required (Lawrence 2000a). Environmental literacy is an attempt to broaden the scope of local knowledge and to provide a more general understanding on local systems.

Local people's environmental knowledge, as well as the interrelatedness of biological and cultural diversity, have become more and more central issues in forest management discussion. These have been considered as keys to sustainable forest management (see e.g. Lawrence 2000a). Forest dwellers' knowledge about the prevailing condition of the surrounding environment, what changes have taken place and what has induced these changes can have a central role in forest management when integrating local and introduced practices (Leeuwen 1998, 13). If forest management is based only on introduced practices with methods, concepts, and management goals brought from outside, unconnected to village activities, the involvement of the local people can be difficult. Such methods and concepts may be unfamiliar or even meaningless to the local forest managers, which results in a situation where they are unlikely to be adopted. Furthermore, foreign frameworks and terminologies impede communication. (Poffenberger 1995; Poulsen & Luanglath 2005).

Exploring the local environmental literacy is important in increasing the understanding of conceptions and actions of local people (Lawrence 2000b, 12). A wide definition of local people can also comprise migrants; examples exist of migrant farmers or communities who have motivation and also ability to develop their land management practices into more sustainable ones. Research on local environmental literacy as related to natural resource management provides a potential basis for improving the rural people's livelihood and meeting the local objectives of survival, as well as the supra-local aims to conserve the forest resources. (Henkemans et al. 2000, 58–62; cf. Santasombat 2003).

For long, it has been discussed to what extent local practices can form a basis for conservation and sustainable natural resource management (Gadgil et al. 1993; Faust & Smardon 2001; Becker & Ghimire 2003). This discussion includes the issue of slash-and-burn cultivation in many areas, including the rural uplands of northern Thailand where in traditional communities slash-and-burn cultivation has been inseparable from forest management (when defined in a broad sense). Thai government's ban of slash-and-burn cultivation and logging in natural forests, its conservation focus, and increasing pressures for creating legislation for community forestry have brought forest management into the process of transformation and put a strain to create new practices.

Although both sustainable and unsustainable ways to manage forests may exist locally, and although not all the forests can be locally managed, new forest management systems can have their grounding on existing local practices that can provide tools for local solutions. Enhanced sustainability is assumed to be achievable through collaborative efforts of all stakeholders. Different, even contrasting, views and objectives of the stakeholders may, however, form an obstacle for these collaborative efforts, and attempts to improve mutual understanding are therefore needed.

1.4 Problem statement

Starting from the attempts to find ways towards sustainable and adaptive forest management this study addressed a basic problem related to the efforts to protect the forest from human interaction on the one hand, and to the fact that people live in forest reserves and protected areas on the other. It, furthermore, examined the different views of use and conservation[4] as presented by the forest dwellers and the government. Despite the emphasis of Thailand's current forest policy on conservation of the last remaining natural forests, deforestation still continues. Local people are typically blamed for this. On the other hand, local inhabitants in forest areas have, after the national logging ban in natural forests, received a key role as actors in forest management, although forest management under the prevailing conservation-oriented forest policy and legislation refers basically to protection and limited use (Poffenberger 2000).

Moreover, the discussion on a community forestry law, preparation of which started already in the early 1990s, continues to be vivid, and questions of community management in protected areas remain unsolved. Forest management by communities is a hot political issue in Thailand. It is, furthermore, related to the process of decentralisation that is going on in the society, also including natural resource management. However, decentralisation in forestry is problematic because the legislation for community forestry is lacking. In addition, the state control continues to be strong, and the problem is that conceptions on the strategies of forest management differ between the government and local people[5], and sometimes between the government and other stakeholders. A lack of mutual understanding exists and new approaches for forestry are needed.

A particular interest of forest policy focuses on the forested northern uplands and their inhabitants. The residents of these forest reserves largely belong to ethnic minorities. Ethnic minorities form a majority of the population in many forest areas and constitute, in general, a significant group within Thailand's protected areas (Buergin 2003). The government has, however, over the years considered them as problematic to cooperate with and accused them of illegal immigration, insurgent activity and deforestation. In addition, poverty is common among these upland minorities. These factors may lead to the minority people's weak sense of belonging to the society, which could result in a weakened interest in sustainable use of natural resources (cf. Johnson & Forsyth 2002). A constraint in involving these people in natural resource management is the lack of mutual trust between upland minorities and officials and also stereotypic perceptions on the minority people based on the problems mentioned above.

The starting point of this study was the premise that a need exists for local-level solutions to deforestation and forest degradation through sustainable management. A baseline was that this requires involvement of local communities and taking of the local people's views and objectives into consideration. It can be stated that particularly in a case like Thailand's, in which commercial utilisation of natural forests has been declared illegal, the way to maintain the forests may well be found among the forest dwellers (Poffenberger 2000).

1.5 Aims of the study

This study concentrated on investigating local forest management in selected villages of northern Thailand, with an emphasis on conservation and sustainable use, and related local environmental literacy, consisting of knowledge, values and practices. The study aimed at eliciting local views and strategies of forest management using qualitative analysis. The

[4] The definition of conservation used: Management to protect from destructive influences and undesirable changes, control of human use of resources to maintain, restore, enhance, and preserve "the quallity and quantity of a desired mix of species, and ecosystem conditions and processes for present and future generations" (IUFRO 2005, 1).

[5] The term local people refers here to the residents of the forested area and its immediate surroundings. 'Forest dweller' is used as a synonym (cf. IUFRO's definition in IUFRO 2005, 29).

purpose was to look at to what extent the current community-based systems combined traditional and recently introduced practices. The ultimate objective was to find ways to preserve remaining forest resources without depriving the local people of livelihood. The study sought to identify locally appropriate solutions to develop more sustainable systems of forest management[6]. This contained a discussion on the prospects to enhance community-based forest management in this kind of ethnically diverse area with strong pressures for conservation.

In order to identify the motivation and objectives of forest management, particularly conservation, it was found necessary to elucidate how the local people in the forest areas assess the significance of their forests; the analysis aimed at illustrating the role of the forest in people's lives. This was viewed as crucial for understanding their motivation to conserve the forest and to participate in the efforts of sustainable management. The way the communities managed the forests was assumed to be closely linked to environmental, socio-economic and cultural meanings of the forest to the local people.

Besides people's motivation and traditions, factors outside of the community were presumed to affect significantly on local forest management practices and land-use patterns. The study aimed to shed light on these factors, including forest policy and local conflict situations. The purpose was to explore possible conflicts as constraints related to forest management. In addition to forest management strategies, also agricultural practices were discussed. Agriculture was the main source of livelihood in the rural upland villages. Traditionally, farming and forest management were integrated, inseparable from each other (cf. Michon 2005, 109). Although this tradition was in the state of transition due to several pressures, this study viewed practices both in agriculture and forest management as still closely interlinked.

The central theme studied, forest management in local communities, was reviewed through the concept of environmental literacy. This concept is applied here to the field of forestry and, thus, used in a new manner which differs from previous educational applications. The main difference is that within this new context, environmental literacy is used to describe people's perceptions without the purpose to assess the concepts in scientific criteria but to present them as the basis for practices and decision-making, not forgetting that they are accompanied by many other contributing factors as well. The term environmental literacy was applied with an aim to broaden the scope of discussion in forestry often centred on the term local knowledge. In general, the underlying objective in studying local environmental literacy is to make local views visible in society and, thereby, increase the understanding of other members of society, decision-makers in particular, and, consequently, even to enhance accountability (Flyvbjerg 2001, 157–61). The study sought, furthermore, a variety of perspectives by investigating also the views of people outside the community.

The general aim of the study was to seek solutions to improve the sustainability of forest management including conservation of the forests and securing people's livelihood. This was hoped to provide insights for the evolution of community-based forest management.
The specific aims of the study were to examine:

1) The prevailing forest management systems in villages in the protected forest area varying in ethnic composition;
2) Local views, interests and objectives of forest management and the motivation for conservation through environmental literacy;
3) The variation between ethnic groups in their relationships to the forest and its management and the government officials' views on this;
4) The environmental literacy on deforestation and other local changes in the environment;
5) Effects of forest policy on local forest management, and conflicts arisen between stakeholders.

[6] Sustainable systems refer to the UNCED forest principles (UNCED 1992) and the MCPFE definition of sustainable forest management cited earlier in this chapter (IUFRO 2005, 43). In this study, social functions are understood to include cultural functions.

Specific questions of the study contained an overview of the changes in land use in the area studied and of forest management practices, including the use of forest resources, found in the communities. Local environmental literacy on deforestation and on changes in the forest environment was examined to gain a view of the background and the basis of conservation and to understand to what degree deforestation is considered problematic in the area studied. Local people's perceptions of the causes and effects of deforestation were investigated to obtain an idea of the knowledge about natural processes and the factors behind forest loss because awareness of these was supposed to make it possible to begin to consider possible solutions. In addition, the study aimed to elicit the sources of environmental information to enable an assessment of the depth and motivations of the expressions of opinions. Moreover, the conceptions of forest officials regarding forest management in the research area were to be investigated, so as to complement the view of the situation at the local level.

Various ethnic groups of northern Thailand are thought to have different valuations of the forest and levels of environmental protection (S. Ganjanapan 1998, 248; Tomforde 2003, 352–3). An attempt was made to critically assess the substance of these stereotypic conceptions, their context, and underlying reasons, and their basis was discussed in the light of the cases. A question was how environmental information on forests and their management is composed of in this kind of ethnically diverse area. This study had no aim to compare the ethnic groups, but ethnicity was regarded as one attribute of the communities studied. The aim was to recognise the heterogeneity of the population in the forested northern uplands and to examine whether and to what extent differences in relation to forest management that are commonly posed in the public and government policy existed. Thus, this investigation made an effort to grasp and describe the main features of the relationship of the ethnic groups studied to nature. An aim was also that instead of comparing different villages, they were selected to represent the area and provide a regional view. Hence, the purpose was to use the villages to construct a holistic concept of the ethnically diverse forested upland[7] and of forest management at the local level.

1.6 Analytical framework

Community forestry includes the notion of participation as its integral part; participation is regarded as a prerequisite for management efforts for them to be sustainable. One attempt to put this prerequisite into practice is community-based natural resource management, which is here regarded as including conservation. In community-based systems, an important element, as was explained, is the inclusion of local people's environmental conceptions. This is here discussed under the concept of environmental literacy, which was redefined for this purpose. The research questions will be discussed in the context of the following frameworks:

- Sustainable forest resource management and social acceptability;
- Environmental literacy on forest management at the level of conceptions, values and priorities;
- Multiple interests at local and national level and the socio-political context of community forestry.

In the case of northern Thailand, management of forests refers, in practice for the most part, to conservation because of the protected area system that largely covers the forests in the uplands. Furthermore, the remaining forests of the North are at the centre of the national debate on community forestry. The main controversial subject in this debate is the communities' role in the management of protected areas. A contemplation on this dilemma requires that forest management is viewed in a broad sense as was described in the context of sustainable forest management and the ecosystem approach. This, furthermore, requires a multidisciplinary approach (Berkes 2004).

[7] Here no distinction between upland and highland is made, but all the areas above 600 m asl. are referred to as uplands (cf. ICRAF 2001a, in which areas above 1,000 m asl. are defined as highlands).

Sustainable management can be viewed from the aspect of different levels, but the principles that the scale of management is compatible with the scale of the system to be managed and that solutions are first locally implemented are acknowledged in the analysis (Berkes 2004). Guidelines based on local socio-economic, cultural and ecological settings are needed particularly in areas with a conservation aim (cf. Ganjanapan 2000, 23). Social acceptability is a key ingredient of sustainable and adaptive management. It is central because people have a right to contribute to decisions about the environment they are residing in, and moreover, implementation of decisions requires public understanding and support. Furthermore, one objective strategy can seldom be found, which is why local conceptions, values and interests are relevant along with other aspects. (Shindler et al. 2002). In brief, it can be argued that local sustainability in forest management requires local criteria and indicators to be included.

As the basis of the study, it was assumed that when the forests are valued, people are motivated for conservation and sustainable use of forest resources if this is made economically and socially possible. To understand local management systems, conceptions and practices, it is important to look at the significance of the forest to the forest dwellers and their livelihood. The types of forest use and values related to regulation, carrier, production, spiritual and information functions of the forest affect the ways the forest is locally managed (cf. Wiersum 1999, 371; Nabanoga 2005, 16–17). In addition, outside factors, particularly the political context, have an influence on systems practised.

To achieve social acceptability of management decisions, local environmental literacy needs to be included as one input. The term environmental literacy will provide a way to look at conceptions, interests and values and also practices. It also provides a perspective on local adaptations to changing contexts and the social mechanisms behind applied management strategies (cf. Berkes & Folke 2000, 19). It is, therefore, also linked to politics (Potts 2000, 45). In practice, the analysis of forest management deals with three components: traditional and introduced practices and management as a political tool to secure community rights or to express resistance (cf. Santasombat 2003, 180–4).

Pluralism referring to the existence of multiple values and interests is one aspect of the environmental literacy concept. As an approach pluralism aims at bringing diverse groups and differences together. Pluralistic approaches aim at empowerment, increased participation and mutual learning. (Wollenberg et al. 2005, 2–5, 69). This requires paying attention to power structures, and the questions of power to be addressed include the following: Whose values dominate in forest management and conservation, and who determines what is sustainable? (cf. Kessy 1998). Thailand's natural resource governance system has been predominantly state-centred even if a decentralisation process has been started. Undermining local practices and conceptions and labelling them as inefficient or even destructive is a means to strengthen and justify central control (Santasombat 2003, 127). Instead, sharing power and responsibility, as well as mutual learning and trust are keys to successful co-management, which should be strived for (Berkes 2004, 629).

The present analysis attempts to take a holistic perspective to human-environment relations; humans are considered as a part of the forest ecosystem. Management should, therefore, involve both people's and nature's well-being. However, the complexity of socio-economic, cultural, historical and ecological contexts poses a great challenge to attempts to find socially acceptable sustainable natural resource management systems. This encourages looking for local solutions while acknowledging the diversity of socio-economic and cultural local contexts and the embeddedness to larger-scale influences as well. Furthermore, as constant changes are inevitable, it is important to look at efforts to sustainable forest management as a process.

2. THEORETICAL FRAMEWORK

2.1 Community-based approaches to forest management and conservation

Community forestry was established in the forestry discussion at the end of the 1970s, but in the 1990s community-based natural resource management schemes started to blossom (Brown 2002). These schemes can be regarded as one component of the ecosystem approach as an effort to boost decentralisation and increased participation[8], and as recognition of humans as an integral part of the ecosystem. Community involvement is important also to achieve an adaptive strategy of management; centralised systems suit poorly for managing complex changing environment (Berkes 2004). Hence, many failures of centralised management to achieve sustainability form the basis for giving the responsibility to communities (Li 2001, 164). Despite criticism, from the conservationists for example, it seems that this devolving process continues to proceed. Thus, the question is not whether community-based management and conservation works but how to make it work (Berkes 2004).

Community forestry usually refers to forested land within a community's perceived borders that the community takes care of at varying degrees and that often provides various products and services for the benefit of the community members (cf. IUFRO 2005, 52). It is often associated with transfer of rights to control to local community. Here the terms community forestry and community(-based) forest management are used as synonyms. Moreover, the term community-based natural resource management, which refers to a wider definition of managed environment and is thus compatible with the aims of ecosystem approach, is used interchangeably. Collaborative management is separated from the terms above as specifically referring to partnership and shared management between a community and government organisations and sometimes also other stakeholders (Carter & Gronow 2005). Thus, it requires advanced participation and devolution, although sometimes the term is used broadly to refer to partnerships with local people without necessarily including power sharing (Castro & Nielsen 2001). The focus of this study was on the community as an actor in forest management but, despite this, it is acknowledged that besides a community also other stakeholders, in particular the Royal Forest Department of Thailand in the case of this study, are important actors in forest management.

Community-based natural resource management has numerous variations but some common characteristics can be distinguished (Kellert et al. 2000, 706):

- Involvement of communities and local institutions;
- Devolvement of power and authority to local level;
- Reconciliation of socio-economic and ecological objectives;
- Promotion of local property rights; and
- Inclusion of local knowledge in management practices.

The premise of community-based management is that local people have knowledge and practices and a greater interest in sustainable resource management than the outsiders (Brosius et al. 1998). Its basic justification is that it is believed to enhance efficiency and equity (Castro & Nielsen 2001). An inbuilt idea of community-based management is that communities are capable of suggesting policy recommendations (Agrawal & Gibson 2001, 7). It can also be viewed as a solution to the so called 'tragedy of the commons' and give the locals rights and responsibility to manage (McCay 2001, 184–5). For this to succeed, self-organisation to manage common resources and the sense of ownership would be beneficial. Factors that encourage the community to take care of the forest include manageability and realistic options to improve the state of the resource, and availability of information. Furthermore, the possibilities for successful community-based management are improved if the forest is important for people's livelihood, equally distributed benefits can be expected,

[8] Participation can be defined as having different levels from informing, conciliation and consultation that can be regarded as efforts to participation and empowerment through partnership, delegated power and citizen control (Arnstein 1969 in Fisher 2000, 4).

mutual trust exists, and certain autonomy in decisions is given and it is accompanied with some experience in organising. (Ostrom 1999).

A central concept in community-based management systems is community; we can ask how community is defined and by whom, and who actually are the managers (Barrett et al. 2001). Varying interests and dynamics within and between communities as well as with other social actors have easily been forgotten when a community-based approach is expected to provide an easy solution to natural resource management and the idea of integrated communities with long-term experiences of sustainable resource use appears tempting. A community is often defined as a spatial unit, social structure or as a set of sheared norms, or a combination of these. In addition, attachment to a certain geographical space is regarded as one feature of a community. (Agrawal & Gibson 1999; 2001). A community may be described as having a shared past, present and future (McCay 2001, 185).

Reality, however, is more complicated. Even when the above-mentioned determinants are used, groups and individuals within them may, in practice, be mobile, and the "communities" may be scattered and large instead of small and unified (Li 2001, 168). As concerns management, several communities may, for example, occupy the territory of one forest patch. In another case, it may be unclear whether a migrant group is coherent enough to be referred to as a community or to develop common system of natural resource management (Li 2002, 268). Moreover, actors having a significant influence on resource use may exist outside the community, further away from the area under management (Brown 2002, 10). Thus, it might be better to discuss user groups instead of communities. In practice, however, communities are often administrative units which governments use for operating management activities in community forestry schemes as in Thailand's case.

It would, furthermore, be a mistake to assume a community (or a user group) as homogeneous. Social and economic differentiation of people who have different access to power and resources, and who have influence on or are affected by natural resource management, can be expected (Brown 2002, 10–12). Ethnic, religious or linguistic homogeneity of a group cannot be assumed to mean homogeneity in other aspects as well. Sharing the norms, for example, in protecting a sacred forest area, does not inevitably mean shared interests within a group – and the norms can also change. It should, moreover, be considered whether shared characteristics are relevant for management. In addition, it is important to recognise that when speaking about a heterogeneous community, conflicts may occur, besides with outsiders, also within a community. On the other hand, nothing can be taken for granted: a highly differentiated community may use its natural resources in a sustainable manner. (Agrawal & Gibson 1999). All in all, disputes between stakeholders, heterogeneous interests, and difficulties to integrate people's needs and conservation must be taken into consideration in implementation (Kellert et al. 2000). Furthermore, it is important to understand who in the community are speaking for the whole group (Worah 2002, 88).

In this study, community refers to the villages studied, including their sub-villages. It was acknowledged that each community has multiple interests and actors and their heterogeneity is also a dynamic character (Enters & Anderson 2000, 175). By definition, community-based management can be expected to have more initiative from the community than from a higher level administration, realisation of which can perhaps be questioned in Thailand's case with a clear top-down approach (Renard 2001b, 79). Here community forestry refers to activities pertaining to the forest carried out within communities collectively or individually, or in cooperation with other communities. Management units regarded as communities are usually defined in administrative terms. The background is that, actually, a state affects significantly in community formation (Li 2001, 169).

Criticism has arisen towards community-based strategies of natural resource management. Not only has the definition of community (usually by people from outside) but also the use of concepts, such as rights, resources and management, been criticised (Brosius et al. 1998). It has also been noted that the assumption of local communities being particularly motivated and knowledgeable of sustainable practices in their surroundings must not be taken for

granted (Enters & Anderson 2000, 174). Critics of current implementation of these strategies state that from the top-down approach, which has functioned poorly, we have ended up to overemphasising the role of local communities in conservation. The success of the community-based approach depends on ecological and institutional conditions, and failures have occurred because of untested biological and socio-economic assumptions. (Barrett et al. 2001). Idealised notions of forest communities as conservationist managers of the environment can, moreover, be harmful when directly used as guidelines in policy formulations. Presumptions may be misconceived and, for example, involving only traditional communities may leave out a number of poor people. On the other hand, however, they can also help to achieve new policy directions. (Li 1996, 502–5).

The main difficulty in community-based management and conservation is the reconciliation of the diversity of socio-economic objectives and conservation (Kellert et al. 2000). Furthermore, the ecological scale of many conservation efforts exceeds the capacity of a single local community. Local communities are effective in conserving ecosystem services and products that have value for them, but outsiders may have additional or other values that may be difficult to include in local management. (Barrett et al. 2001). Another constraint of community-based approach, along with the heterogeneity of interests and practices, may be the weakness of institutions at all levels (Kellert et al. 2000; Barrett et al. 2001). Centring attention to institutions instead of communities could actually prove a more fruitful approach (Agrawal & Gibson 1999). The requirements for institutions may, for example, include capability and willingness to restrict access and use, ability to provide incentives for conservation and sustainable use, technical capacity for monitoring, and adaptability to changes (Barrett et al. 2001). Legislative basis of community-based management needs also to be considered (Brosius et al. 1998).

Community forestry has, however, widely agreed advantages as a way to operationalize adaptive management at the local level. It is, for one, a means to reduce conflicts over natural resource use and conservation (Castro & Nielsen 2001). With systematic planning, apart from the availability of forest products, equality in benefit distribution can be improved (Yadav et al. 2003, 46). As diverse groups with diverse values are involved, identification of each group's objectives is required. When varying views are recognised, methods acceptable to all stakeholders can be negotiated. Although conflict may be unavoidable, knowing different views may help identifying the ultimate reasons for forest management conflicts. (Lee & Kant 2003).

A further advantage of community-based management is that it provides a basis for developing integrated management systems that combine local and introduced knowledge and practices (Castro & Nielsen 2001, 237). Studies of traditional, indigenous or local knowledge – or environmental literacy as in this case – on forests can be viewed as supporting community-based management and aiding to perceive the connections between social and ecological systems (Berkes 2004, 624). All in all, a community approach has a potential to increase the sustainability of and local commitment to management and conservation. Good results have been achieved when local people have been involved in defining the criteria and indicators of sustainable forest management and monitoring their realisation (e.g. Hartanto et al. 2002). Moreover, community-based natural resource management can be an instrument to draw attention to people in peripheral areas (Li 2002, 277). The role of community forestry in improving the living conditions of these people, poverty alleviation, increasing equitability and improving environmental services, needs to be further studied (Glasmeier & Farrigan 2005, 65–66).

2.2 Environmental literacy as a tool to focus on the local level

The concept of environmental literacy is applied in this study instead of the commonly and also interchangeably used terms local, indigenous and traditional knowledge. Environmental literacy was originally used for educational purposes but is here redefined to gain wider applicability and to be applicable also in the context of forest management. Before

redefinition, however, follows a brief review of the background: discourses related to 'local people's knowledge', and uses of environmental literacy and the related terms.

Changed attitudes towards local knowledge

Local or indigenous knowledge, instead of being regarded as ignorance or superstition, have gained an increasingly important role in local development (Sillitoe 1998b; Long Martello 2001). During the past two decades, a broader category of knowledge than just the scientific one has started to be emphasised in development efforts (Long Martello 2001, 115). In particular, environmental projects have begun to view indigenous knowledge as a potential alternative to find more sustainable solutions for natural resource management (Steiner & Oviedo 2004; Davis 2005).

Local knowledge has been viewed differently in the development discourse. Three development paradigms with different approaches can be distinguished: classic, neo-liberal and neo-populist. The classic paradigm considered local knowledge as a part of the problem and denied its relevance. Then rose the neo-liberal paradigm that remained technology-focussed and stressed the rational, market-oriented choices at the local level. These paradigms have been followed by the neo-populist paradigm that prioritises local knowledge and conceives it indispensable and a way to empowerment. (Blaikie et al. 1997, 219–26; see also Sillitoe 1998b, 211–4). These paradigms are put into practice in six ways, which each value the local knowledge differently: the classical paradigm denies local knowledge; the neo-liberal regards it as having financial or functional value; whereas the neo-populist paradigm views it as esteemed, negotiated, or as a medium of empowerment (Blaikie et al. 1997). The starting point of the so called 'beyond farmer first' populist perspective that appeared at the turn of the 1980s and 1990s was the idea that people have divergent, sometimes conflicting interests and objectives, and also different access to resources within a local community. Thus, the goal was determined as conflict resolution and negotiated agreements between interest groups rather than finding consensus solutions. (Thompson & Scoones 1994, 61–62).

When looking at environmental schemes in particular, the emphasis at the beginning was on the effort to minimise the harm the humans cause to the environment, which meant that local knowledge was more or less denied as in the classic development paradigm. Then it was realised that it is at least equally important to reveal the environmentally sound human activities (Milton 1997). Economic aspects of conservation have been addressed for long and the significance of local people's knowledge has increasingly started to be emphasised. For example, ethnobotanical information has been recognised as invaluable in tracing vegetational changes in Africa (Lykke 2000). Today, it is more and more often considered that to solve environmental problems it is as important to understand the various actors, claims, and social, politic and cultural contexts as the ecological attributes (cf. Barry 1999, 171, cit. in Irwin 2001, 165).

As for sustainable tropical forest management and conservation, indigenous or local knowledge has in many studies been viewed as a good basis (see e.g. Posey et al. 1984, 97). Participation is widely regarded as a tool to include indigenous knowledge in environmental management schemes. The assumption behind the requirement for participation tends to be that scientific knowledge has something to contribute to the development process at the local level and that scientists should be affirmed of the relevance of indigenous knowledge. On the other hand, it needs to be recognised that indigenous knowledge research can potentially even disempower people by making their knowledge inaccessible to them and beyond their control. (Sillitoe 1998a, 225, 231–4).

Brief review of previous research on environmental literacy

Environmental literacy has been commonly used as a pedagogical concept and its origins can be traced back to the turn of the 1960s and 70s (Hsu & Roth 1998). It has been used in relation with environmental education at various grades and levels. The term has appeared particularly in the Northern American discussion (Gayford 2002, 100). It was a topic of several studies especially in the 1990s. As an educational term environmental literacy is defined as comprising of knowledge, which is considered a central ingredient, awareness and concern. Educationalists have studied environmental literacy, which has been considered as a result of environmental education, at all levels from kindergarten to university. These studies have typically investigated the knowledge and awareness of people on environmental issues such as greenhouse effect. Often educational studies have focussed on developing environmental teaching, and pedagogical tools to improve environmental literacy have been developed (Clausen 1989; Barrett et al. 1997).

Environmental awareness has been closely linked to environmental literacy. For example, Thomas G. David (1974), who defined environmental literacy as a capability to link understanding with action, regarded environmental literacy as a means to improve environmental awareness through formal education. Awareness was a central idea also for Paulo Freire (1972) who can be regarded as a pioneer in the foundation of the concept in its pedagogical sense. He worked with the rural poor not only teaching them to read and write but also aiming in that way to wake up their critical consciousness, which, according to Freire, at the second stage leads to action. Awareness and sensitivity are also included in Andrew Brennan's (1994) definition of environmental literate citizen who, to his view, ideally has ecological sensitivity added with moral maturity and awareness of natural processes. These features, states Brennan, together usher people to avoid unsustainable practices at individual and corporate levels.

Another key term often linked to environmental literacy is sustainability, including the same thinking as Brennan (1994) that environmentally literate people, meaning that they possess scientific knowledge about the environment, are capable of environmentally responsible behaviour (e.g. Hsu & Roth 1998; King 2000). This idea of environmentally responsible behaviour has increasingly started to accompany the term environmental literacy, to describe the goal to transfer knowledge and awareness to action. David W. Orr (1992) views ecological literacy (which can be regarded as synonymous to environmental literacy) as a tool for sustainability, requiring a sense of wonder, an ability to read preconditions and to think broadly. Essential for people to be able to live in a sustainable manner, in Orr's view, is understanding the underlying reasons, dynamics and processes of the world, and of how societies relate to nature and to each other.

Sustainability and education have been central in many studies that have assessed environmental literacy, that is knowledge and awareness of environmental phenomena, from young children to adults (Hausbeck et al. 1992; Mancl et al. 1999; Salmon 2000). In addition, respect of nature has been studied as a starting point for environmental education of small children (Basile & White 2000; Britsch 2001). A weakness, however, of the definition used in the studies of educational basis is that it tends to exclude other factors affecting behaviour apart from education and awareness. Furthermore, these studies have a tendency to regard scientific knowledge as the only basis of environmental awareness (e.g. Golley 1998).

Educational studies of environmental literacy have thus far concentrated more on ethnic majorities in western societies. On the other hand, research on indigenous or traditional knowledge or even local knowledge, which can be juxtaposed with environmental literacy, has focused on rural areas often in less industrialised countries and on ethnic minorities. These studies first centred their attention to identification of names, classifications, uses, beliefs and techniques (Ellen 1982, 212–3). Gradually, however, the interest was directed increasingly towards people's understanding of ecological processes and their relationship with the environment (Berkes et al. 2000, 1252).

Environmental literacy as defined in this study has, however, been examined also in numerous studies on forests, tropical forests in particular, although instead of environmental literacy terms such as local knowledge have been used. Themes like sustainability and environmentally sound behaviour have been important also in these studies, but the focus has differed from the educational studies of environmental literacy. In general, biodiversity and globally usable utilities have been central topics. Another central theme has been to seek for solutions to combat tropical deforestation. A leading idea of the studies has been that combining modern science and traditional strategies could provide a solution (e.g. Gómez-Pompa & Kaus 1990). One way of searching for solutions has been to investigate traditional agricultural practices (e.g. Alcorn 1990; Warner 1991). Indigenous forest management practices interrelated with agricultural systems have also been studied and connected with local livelihood (e.g. Wiersum 1997). This meant that social mechanisms, such as institutions and cultural values, behind management practices also needed to be taken under examination (Berkes et al. 2000).

The discussion was not only focussed on the vanishing tropical forest ecosystems but also on the loss of the knowledge of various uses if the peoples who have inhabited those areas for generations move away or change their lifestyle entirely. Darrell Posey (1988, 90) suggests that the ideas and knowledge of these peoples may be the richest of all tropical resources; indigenous knowledge systems have been viewed a resource for the future (Pawluk et al. 1992, 302). The worry has been that with the loss of knowledge, not only cultural and environmental resources are lost but also the range and diversity of management choices are decreased (Gómez-Pompa & Kaus 1990, 60).

Related terms

Researchers have had to navigate in the jungle of various terms with divergent definitions; after all, these terms can be defined more or less similarly and used interchangeably. For example, indigenous, local and traditional knowledge have typically been used to describe the same character (Long Martello 2001). Furthermore, their recent definitions, especially with the idea of hybrid knowledge, are rather similar to the one of environmental literacy used in this study.

Opinions have differed concerning the appropriateness of these terms, such as indigenous, traditional, and local knowledge, which attempt to describe such localised knowledge that is possessed by a member of or a group that has lived close to nature and obtained livelihood from natural resources for generations (e.g. Sillitoe 1998a, 224). However, these terms have been widely accepted and used by researchers. Awareness of the limitations of earlier definitions has motivated researchers to redefine the concepts. Redefinitions have increasingly highlighted the hybrid nature of knowledge referring to various sources where knowledge is acquired (e.g. Martin 2003; cf. Steiner & Oviedo 2004, 32). Previous definitions and connotations, however, still appear, and when hybrid knowledge is at issue, the words traditional and indigenous can actually be regarded as misnomers (Hares et al. 2006). Thus, it may be useful to briefly review how these terms have been used.

Indigenous knowledge (often abbreviated as IK) can simply be defined as knowledge unique to a particular culture or society, which can be considered as a contrast to the international knowledge system (Warren et al. 1995, XV). It is always situational, variable and changing, and may vary according to social factors such as gender (Ellen 1998, 93–94). In addition, more specific expressions, such as indigenous technical knowledge and indigenous agricultural knowledge, have been used (e.g. Bell 1979; Bebbington 1991). In the turn of the 1970s and 1980s, the focus was on indigenous technical knowledge. Later on, cultural aspect became dominant stressing the interlinkage of non-technical and technical knowledge as well as skills and capabilities (Thompson & Scoones 1994, 58–60). Altogether, in these earlier definitions the same elements can be found: indigenous knowledge is bound to place and time, possessed by the rural people, and comprised of the empirical contents (Bebbington 1991, 15). The typical characteristics given to indigenous knowledge can be summarised as

follows: it is local and personal in nature, derived from subjective empiricism, and it is finite, holistic and alive, and can include supernatural elements, and its decisive factor is the length of time that a certain group has had to adapt to the environment (Browder 1995, 19–20).

As mentioned above, indigenous knowledge has been redefined so that it would meet the requirements of wider usability. Nevertheless, new definitions tend to be largely based on the previous ones. For example, the World Bank has defined indigenous knowledge within its Indigenous Knowledge Program (1998–) as local knowledge that is unique to every culture and society and as tacit, hence, difficult to codify. It is regarded as the basis of local-level decision-making particularly in agriculture, food preparation, health care, education and natural resource management; the means for problem solving; and a feature of a community rather than individuals. Indigenous knowledge is viewed as changing and as an integral part of ecosystems, and significant for development efforts. (World Bank 1998; World Bank, undated).

Traditional knowledge has more or less been defined similarly to indigenous knowledge. A further specified form of the term that emphasises knowledge on nature and is often used is traditional ecological or environmental knowledge (TEK). As indigenous knowledge, traditional knowledge has been used to refer to people in relatively non-technological societies dependent on the land (Kimmerer 2000, 5). Traditional ecological knowledge has been divided by definitions into three interrelated components: people's beliefs, practices and biological knowledge, which can also be regarded as describing indigenous knowledge. Ideas of a cumulative body of knowledge, evolvement through adaptive processes, and cultural transmission through generations are repeated in these definitions. The notion of knowledge accumulated through generations has been associated with both traditional and indigenous knowledge (Gadgil et al. 1993). However, it has been acknowledged that changes in society and the environment constantly alter people's conceptions and demand adaptation. On the other hand, not all traditional systems were adaptive in the first place and some of them became maladaptive due to changing conditions and, moreover, it is agreed that not all traditional practices are ecologically sound. (Berkes et al. 2000, 1252). In addition, the category of traditional knowledge is increasingly often regarded as encompassing various ways of knowing (Long Martello 2001, 114).

The word *ethnoscience* has seldom been used in forest research but is rather related to anthropological studies. The basic idea is that people know their culture and use that knowledge to survive (Werner & Fenton 1970). Ethnoscience has been defined as the set of concepts, propositions and theories possessed by each cultural group (Meehan 1980, 379). Thus, the same traits as in indigenous and traditional knowledge that ethnoscience is embedded and culturally determined are found again. This concept is tied to ethnic groups.

Local knowledge is a widely used term that seems to have a broader connotation than the terms discussed above although it has been defined similarly. It refers to a certain area and information on its environment. Its problem is considered to be the vague definition of local people and confusion on how to define local knowledge and how to distinguish it from other sorts of knowledge (Blaikie et al. 1997, 232).

In the following, environmental literacy will be defined. It can be noted that it is basically similar with the terms described above. After that, the discussion of dichotomisation will guide to the examination of the various concepts. They are reflected and critically examined in relation to environmental literacy.

Redefining environmental literacy

Environmental literacy seems to lack common definition (Gayford 2002). In this study, environmental literacy is defined differently from the customary uses in educational and pedagogical research.[9] Here it refers to people's conceptions of their physical environment constructed as a result of amalgamation of information from various sources, such as experience, oral sources, education, and mass media. In transmitting knowledge, the language is a significant tool but practice and imitation are also ways of acquiring new information. Through these tools culture influences environmental literacy and the other way around. A valuable quality of environmental literacy is the ability to constantly adapt to changing conditions, not only to environmental but also social, economic and political conditions. In brief, environmental literacy is understood as the holistic understanding of the natural environment and its processes and interrelatedness with human systems; hence, it is more than just knowledge of species (Fig. 2).

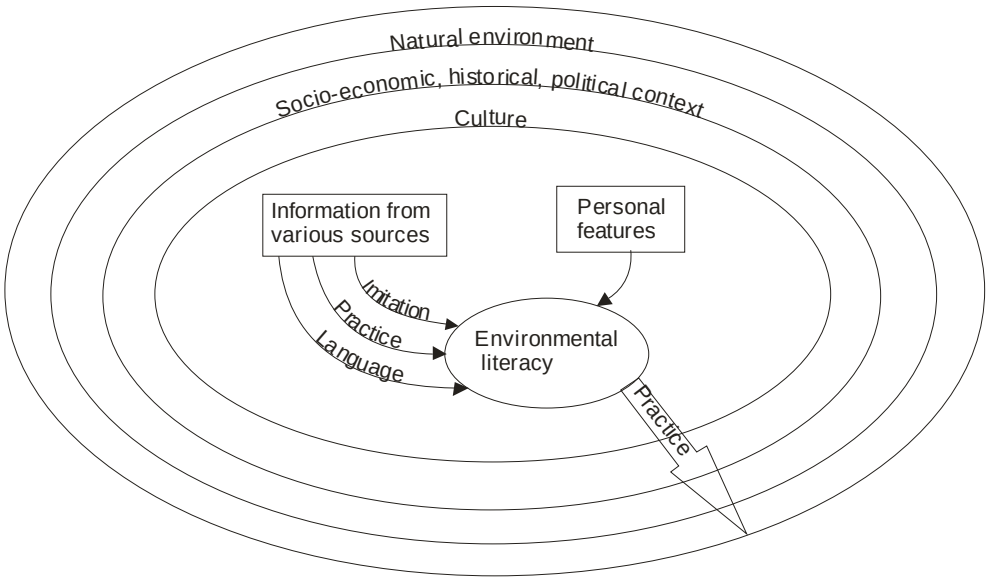

Figure 2. Environmental literacy is a synthesis from various sources and conditions.

Social, economic, cultural, historical, political and ecological circumstances as well as individual features, such as age, gender, residence, occupation, and social status, contribute to the formation of environmental literacy. It is, thus, an individual characteristic influenced by collective features at various levels. Environmental literacy is personal and subjective but at the same time inextricably interlinked to a broader framework at local, national and global levels; as members of communities, people share many factors, for instance traditions, beliefs, and values, in the background of environmental literacy. Everyone has environmental literacy, only the ability to analyse and interpret information varies. It is also possible to investigate the environmental literacy of a certain group characterised by common features such as education and age. (Hares et al. 2006)

Experience has often been emphasised as a significant means to learn from the environment (e.g. Orr 1992). Kay Milton (1997), for example, states that "[a]nthropologists appear to agree

[9] The definition here is based on Hares et al. (2006).

that the manner in which people understand their environment derives from the way they use it and live within it." She continues that farming systems and interaction with animals centrally affect people's environmental perspectives. (Thus, she refers to environmental literacy as primarily a rural people's feature.) Environmental literacy, as it is defined in this study, also recognises the significance of experience, but the emphasis is on synthesis: Apart from experience, also in rural communities today, several other sources of information exist.

An important aspect of environmental literacy is that, in addition to the ability to perceive and interpret the physical environment, it contains the ability to "write", use information in practice. This could mean the ability for sustainable use, management and protection of the environment, but, in addition, many other factors also affect human behaviour. These factors can be political, cultural, economic or social. They may drive people to unsound practices despite their understanding of nature; people may, for example, be forced in a short term to act contrary to their knowledge to survive. On the other hand, environmental problems may occur due to lack of knowledge or, for instance, difficulty of interpretation (cf. Orr 1992; Prakash 1995) – or people can end up in sustainable solutions without knowledge regarded as correct in scientific terms, based on their beliefs, for instance. Myths and beliefs can result in protection or extinction (Becker & Ghimire 2003). Because of beliefs or other reasons, people may sometimes behave in a way that may not seem optimal or expedient. Furthermore, in some cases, problems are well understood but solution would require collective action and people may lack information, commitment, or possibilities, for example, to involve other stakeholders.

In studying environmental literacy, its dynamic character has to be taken into account. Environmental literacy has to adapt to altering circumstances in order to remain viable. There are several factors in which changes may challenge the utility of former literacy, for example, rapid population growth or other demographic changes, disasters and other extreme events (e.g. war), commercialisation and economic shocks, and environmental changes such as climate change, pollution, deforestation and degradation (Blaikie et al. 1997, 233–4).

It should, furthermore, be recognised that questions of power and knowledge need to be examined. This is necessary because, as Bent Flyvbjerg (2001, 154) puts it, "power defines what gets to count as knowledge". The aspect of power has been included in some studies on environmental literacy. Stephen Schneider (1997), for instance, focussed on the significance of environmental literacy for decision-makers and other ones who have power, whereas Roger J. H. King (2000) emphasised political and social understanding in being environmentally literate. In this context, however, the angle needs to be widened. Power is a central factor in determining people's behaviour and even influencing their thinking. Perceptions of environmental problems may vary depending on access to power. Decision-making can be influenced by preferences to views of certain groups. (Davis 2005; see also Wilshusen et al. 2002). It needs to be asked whose views dominate (whose environmental literacy counts), to what extent power modifies or shapes perceptions, and what role power relations play in people's way of acting (Banuri & Marglin 1993). Study of the environmental literacy of minority people, for instance, could help to improve their position in environmental policy formulation and function as a tool for empowerment and encouragement of active participation (Leautier 2004).

Attempt to avoid dichotomisation

The terms indigenous, traditional and local knowledge are often viewed in confrontation with scientific knowledge. They are easily regarded as specialised, localised, and different from science, basically because they are acquired and transmitted differently. (Ellen & Harris 2000). Differences and dichotomisation between knowledge types have been discussed: scientific and non-scientific (e.g. Arce & Long 1992, 211), traditional and modern (Swift 1979), indigenous or traditional and scientific (Johnson 1992), local and external (Long 1992, 168), and indigenous and exogenous knowledge (Messerschmidt & Hammett 1998, 27–28). The criteria commonly used in these dichotomisations include ways of transmission and learning,

spiritualization, objectivity, type of information, generalizability, and the systems of explanation and prediction (Johnson 1992, 6–9; Kimmerer 2000).

Scientific and local knowledge have often been classified as two distinct and broad categories; at the utmost, they are seen at the opposite ends of a knowledge system continuum. This has been criticised and stated to lead to contradictions (Agrawal 1995). On the other hand, the two categories have been examined as separate but basically similar. Some researchers, for example, regard all knowledge as local (Raedeke & Rikoon 1997; Turnbull 1997). Moreover, even some of the researchers studying the differences between indigenous or traditional and scientific knowledge state that differences are actually artificial rather than real (Newhouse 2004, 153). For example, Herry Purnomo (2003) distinguishes local and scientific knowledge but, nevertheless, states on the basis of his results that the two are similar, only the use differs. Robin Roth (2004b) concludes that a difference between scientific and traditional knowledge results from their institutional location.

Dichotomisation has been commonly viewed as an unfruitful approach and it has been deserted in many recent studies (e.g. Nygren 1999; Martin 2003). Environmental literacy is also an attempt to this direction: It is a synthesis from all the various sources of information, which is more than the sum of its parts and, thus, it helps to avoid dichotomisation. Knowledge from different origins can be blended, and tracing the origins of practices and concepts is often impossible (Brodt 1999, 360–2). The juxtaposition of traditional as opposed to modern knowledge can be regarded arbitrary – in practice they are intrinsically mingled together (Nygren 1999, 279).

The use of dichotomies has a considerable impact on people's way of thinking and their preferences of one form of knowledge over the other. Those who regard themselves as "developers" are often the ones to set the criteria of what constitutes knowledge and who is qualified to know. Collecting indigenous knowledge can be considered merely as extracting raw material. (Nygren 1999, 271–3). This means that power can be used to determine the value of knowledge and valuing knowledge reflects power relations. Dichotomisation can lead to distinction between privileged and suppressed knowledge and, consequently, to increased marginalisation (Davis 2005).

Dichotomies may also lead to romanticizing local knowledge. The terms indigenous and traditional commonly refer to authenticity (Forbes 1999). Even the concept of a 'noble savage' may be reintroduced (Levang et al. 2005, 4). Local people may be regarded merely as passive recipients of scientific knowledge. Moreover, scientific knowledge may be considered as existing out of time and space and, thus, outside of the cultural and social context, or science associated as an external agent representing outside interests in contrast to local insider interests (Raedeke & Rikoon 1997, 147).

The idea of environmental literacy is not to unify knowledge bases or to deny their differences but to bring up a new concept that acknowledges heterogeneity of groups and, at the same time, avoids confrontation between various knowledge bases and situating them in unequal position in developing enhanced practices. If a project aims at finding solutions, for example, by utilising both indigenous and scientific knowledge, it is likely to associate indigenous knowledge as has been described above (generated through personal experience and transferred from one generation to another), which may be over-simplistic and not necessarily applicable in today's world. Besides, integration of different types of knowledge meets challenges if indigenous and scientific knowledge are viewed as separate: for example, spiritual aspects may promote sustainable practices but are excluded from the scientific knowledge base (Purnomo 2003, 89). On the other hand, acknowledging that besides scientific also other sources of relevant environmental information exist does not mean that the position of scientific knowledge is superseded but just to note that locally other sources may be significant.

Culturally, the knowledge transmitted from generation to another may be just one segment of a knowledge base and many other sources exist as well. Differentiation usually means

regarding scientific knowledge as superior. This, however, seems to be an unfruitful starting point. Analysing differences in people's knowledge seems to be irrelevant when searching for practical applications. Of course, this does not mean that the aim of using different bases of information is futile, on the contrary, utilising different stakeholders' specific knowledge would most probably lead to improved strategies, for example, in forest management (see e.g. Becker & Ghimire 2003).

Discussion on the concepts

Words traditional and indigenous are often regarded as value-laden words and not accepted by all researchers. The term local knowledge has not escaped criticism either. In the following, the main issues of criticism regarding these commonly used concepts are discussed.

Local knowledge refers to a sense of place (Long Martello 2001, 114). It may have a connotation that it has no wider applicability (Nygren 1999, 283). The main difficulty, however, in using the concept local knowledge is how to define 'local'. It refers to the residents of a certain area but leaves unclear what is that certain area, how its borders are defined, who are the local people, and by which criteria they are defined (see e.g. Forbes 1999). Local community is thus also an ambiguous concept: how to define it, and do its members share some common values or interests relevant in context? Moreover, within the same locality, a landscape for example, many different local communities may exist. Then it may become blurred what actually is local knowledge and who possesses it. In addition, the knowledge called local has also ingredients from outside the area.

The term local knowledge seems, furthermore, to include an assumption that people are automatically experts on their surroundings. However, for example, migrants or those who reside most of the year outside the area may lack knowledge on it, despite being considered as local. On the other hand, pastoralists who move from place to place on seasonal basis may very well possess knowledge on different areas. Sometimes these groups are excluded from the definition of local but it still remains ambiguous on what grounds local people should be defined. On the other hand, the local knowledge possessed by recently arrived migrants is often understated although they may be able to build up detailed knowledge on the new environment and its resources in a relatively short time (Muchagata & Brown 2000). For the forest management schemes, for instance, exclusion of certain groups may be inappropriate. Moreover, it may depend on the means of livelihood which type of knowledge a person possesses.

In using the term indigenous knowledge a problematic issue is the debatable definition of who are indigenous (e.g. Colchester 2002). Furthermore, 'indigenous people' appears to be a political term that is used to refer to certain minorities. It may be also asked whether their indigenousness is relevant in the context (Swift 1979, 41). Another issue which has been regarded as questionable is that the term indigenous, like the words ethnoscience[10] or ethnoecology, refers to a specific ethnic group (Long Martello 2001, 114). Moreover, a group of indigenous people is typically regarded as a collective, whereby a danger to ignore intra-community differences appears (cf. Colchester 2002). This is on what grounds the terms indigenous and traditional knowledge have been criticised for: connotation to homogenous knowledge systems.

The attribute traditional implies historically situated knowledge (Long Martello 2001, 114). The terms traditional and indigenous knowledge are easily associated with their earlier definitions, which inadequately stress the dynamic nature of knowledge systems; despite the efforts of redefinition, traditional and indigenous have been blamed for associations with stability. The term traditional implies the repetition of fixed body of data although knowledge is constantly

[10] In addition, ethnoscience has "a competing meaning in linguistic anthropology, where it is limited to semantic analysis of folk taxonomies" (Nygren 1999, 283).

evolving (Pierotti & Wildcat 2000, 1338). Adaptation to constantly changing conditions is, however, a requirement for the viability of a knowledge system. Moreover, the term tradition is problematic due to a long-lived idea of it including attitudes of simple, savage and static (Berkes et al. 2000, 1251).

Indigenous knowledge can also be associated with these attributes of traditional and static, which is criticised. In fact, constructions of environmental knowledge have hybrid and contested histories, including movement, invention and contest, as Michael R. Dove's (2000) study on small holder rubber producers in Indonesia illustrates. The rubber tree (*Hevea brasiliensis*) is in Indonesia away from its original biological and cultural environment, and through innovation, experimentation and diversification Indonesian small holders have produced knowledge on its cultivation. Dove concludes that the concept indigenous knowledge is actually flawed and has changed from useful to less useful. Even remote people's knowledge is not isolated and outside history; communities have outside knowledge and their knowledge can also exist outside. (Dove 2000)

Another common connotation is an underlying idea that indigenous and traditional knowledge suggest harmonious co-existence with the nature. For example, Herry Purnomo (2003, 150) states that local people (whom he equals to indigenous people in the context of Indonesia) "always try to live in harmony with nature". However, this cannot be presumed: several examples show that indigenous communities may have environmentally unsound practices (Kalland 2000, 222–3). Using the concept environmental literacy helps to avoid this type of connotations and romanticising because it is not linked to a specific group and acknowledges other factors that affect behaviour.

One ground for criticism is that indigenous and traditional knowledge have in many cases been treated as men's or elder people's knowledge (cf. Steiner & Oviedo 2004, 32). The study of indigenous or traditional knowledge or ethnoscience has often concentrated on elder people as key informants because of the definition referring to traditions and accumulated knowledge. Environmental literacy, instead, regards everyone in a heterogeneous community as a potentially significant informant. In searching for sustainable long-term resolutions for forest management, for example, the views of the young generation as at least as important as those of the older one (cf. Enters & Anderson 2000, 174).

Applicability of the environmental literacy concept

The discussion on indigenous knowledge is often restricted to the rural people's body of knowledge, science and techniques, while the studies that have used the term environmental literacy have been for a large part concentrated on western industrialised societies. An aim in redefining environmental literacy is that it would be applicable in any context: rural and urban settings, different economies and cultures. Widening the scope of examination to different circumstances brings, though, new challenges for the definition and requires a broader viewpoint.

Essentially, the purpose of environmental literacy is, on the one hand, to clarify the terminology by combining the efforts to redefine various previous concepts and, on the other hand, to broaden the scope of research. The advantages of the terms on which environmental literacy is based, for instance, in bringing up technologies adapted to local ecological, socio-economic and cultural conditions, remain undeniable.

Broadening of thinking to include, besides knowledge, also assumptions, attitudes, values and cultural categories of thinking provides an improved insight into human relationship with physical environment (Bowers 1996). Acknowledging values as a part of the concept makes them more visible and helps to see whose values are dominating, for example, in defining conservation or biodiversity (cf. Kassas 2002, 347). In addition, inclusion of behaviour can be regarded as another strength of environmental literacy. This is indicated more clearly in the word literacy than in the word knowledge. Literacy consists, apart from the ability to read, also

of a skill to write, which refers to the capability to use knowledge to function appropriately. This includes much more than just literacy in written information.

In brief, environmental literacy as a term does not refer to any specific group, ethnic background or locality or environment, and it compounds information from diverse sources. It excludes no one and is globally applicable. It is defined as dynamic, constantly changing, and including a capability of creating programmatic solutions to identified problems. Dynamism is a crucial element of environmental literacy; factors inducing changes in environmental literacy may include demographic or economic changes, or natural hazards, for example (Blaikie et al. 1997).

Because knowledge and learning are socially constructed, it is important to pay attention to the flows of information (Poulsen 2003, 41). Environmental literacy provides good opportunities to this type of examination. In addition, it can present a discriminating tool for investigating diverse factors influencing people's views of their environment. Examination of the factors preventing or hindering the application of environmentally sound practices derived from environmental literacy is also important.

Despite these advantages of environmental literacy, pedagogical definitions of environmental literacy may prove problematic for the new uses of the term. The previous definition contained an idea that people's ideas are compared to scientific knowledge, which may consequently lead to a notion of superiority of scientific knowledge. Anyhow, a redefined environmental literacy also recognises the significance of science in producing information on the environment and as a reference point but, as mentioned above, wants to avoid elevation of one knowledge system above the others. Furthermore, the fruitfulness of viewing issues from different aspects and combining them is highlighted.

Environmental literacy can be criticised for stressing individuality but after redefinition it is acknowledged that collectiveness contributes both to formation of environmental literacy and its manifestation in behaviour. Another source of criticism regards the problem of generalisation, applying information in practice on a wider scale than just to a limited locality. Variety of ecological, societal and cultural conditions accompanied with individual features makes applicability of designed strategies based on environmental literacy difficult over large areas. (Hares et al. 2006). The local importance is, however, apparent.

To sum up, applicability in the study of heterogeneous groups, notion of dynamism, and avoidance of valuations or confrontation of different types of knowledge are the main advantages of environmental literacy. Links to behaviour, the goal of sustainability, and possibility to include various stakeholders make the concept well applicable in the examination of environmental problems and in natural resource management. The aim of redefined environmental literacy in the context of forest management is to assist in examining various stakeholders' views and objectives. Its purpose is to provide a flexible alternative that would be applicable to various circumstances and environments. This approach views knowledge, values, attitudes, and beliefs as significant for practical manifestations but acknowledges the importance of examining a holistic picture including other factors in the environment and society affecting people's actions. (Hares et al. 2006)

3. CONTEXT – THAILAND'S FOREST RESOURCES AND FOREST POLICY

3.1 From the early steps of forest management to strive for collaboration

Already in the early Ayutthaya period (1350–1767) all the land in Thailand was regarded as the property of the King. Despite this, old customs and traditions ensured the right to take land for cultivation. Around the mid-1800s, plenty of unused land existed, and actually under-population was seen as a hindrance to the development of the country. Therefore, neither the government nor farmers had a need to demarcate property. (Sato 2000, 155). The government put more emphasis on the control over people rather than land. However, exploitation of the forests by Europeans, first in the neighbouring countries and later through concessions in Thailand, increased the economic value of the forests, in particular the teak forests of the North. (Pragtong & Thomas 1990, 167–8). Local chiefs controlled the forests before the establishment of the Royal Forest Department (RFD), and many of them gained profits from logging contracts (Sutthisrisinn & Noochdumrong 1998).

The government wanted to do something to regulate harvests of the valuable species, particularly teak, and to benefit from logging through royalties and taxes. King Chulalongkorn travelled in the Dutch and British colonies to study their forest administration systems and decided to employ a British forester H. Slade. Based on Slade's recommendation, in 1896 the King established the Royal Forest Department within the Ministry of Interior. A British forester was employed to train the Thai staff. Thus, although Thailand was never under colonial rule, Europeans influenced the development of country's forest management concepts and practices. (Poffenberger 1990, 17)

The Royal Forest Department (RFD) was created as a solution to concerns over the commercialisation of teak production and weak administrative and tax control on teak harvesting in northern Thailand. After claiming the formal forest ownership in 1899, the government was able to collect royalties from all teak logging. However, the RFD had no control over the utilisation of other than teak forests until 1913 when the Forest Conservation Act was enacted. That law divided the forest tree species into reserved (including teak) and unreserved classes, of which the latter one was exploitable by anyone. (Hafner 1990, 80; Lakanavichian 2001, 8). In addition, the government began collecting royalties on non-timber forest products (Pragtong & Thomas 1990, 169).

Komon Pragtong and David Thomas (1990) distinguish four periods of forest management since the establishment of the RFD. The first one continued until 1953, covering the period before the Land Act, and was characterised by development of forest management systems and a forest industry; forests were managed for commercial timber production. The second period from 1954 to 1967 was marked by use of forest land to promote economic development. Before the third period, timber concessions were primarily concentrated in the North. During the third phase, which started in 1968, long-term timber concessions were extended. This period, up to 1980, was characterised by rapid deforestation. The fourth phase from 1981 onwards can be called a transition period when the focus began to shift towards conservation, and the role of communities in natural resource management was started to be recognised. (Pragtong & Thomas 1990). This change of focus was particularly notable since the 1989 national logging ban in the natural forests.

3.2 Forestry legislation

Thailand has several laws related to forest and resource management and biodiversity conservation. The most central ones for the forests are (Sutthisrisinn & Noochdumrong 1998; Makarabhirom 1999):

- The Forest Act (1941, last amendment in 1989) that distinguishes the economic and reserved tree species and covers logging and the collection of non-wood forest products.

- The National Park Act (1961) that aims at protecting areas within its boundary in natural condition.
- The National Forest Reserve Act (1964) that followed the Forest Reservation and Protection Act of 1938. It is more permissive than the National Park Act.
- The Wildlife Preservation and Protection Act (1960, amended in 1992) that allows the designation of wildlife sanctuaries.
- The Forest Plantation Act, also known as Re-Afforestation Act (1992) that promotes private forest plantations in degraded reserve forests. (Pragtong 2000).
- The Environmental Promotion Act (1992) that aims to promote and maintain the quality of the environment. It includes an obligation to report on the environmental effects of projects.

The National Forest Reserve Act was amended in 1985, along with the launching a new Forest Policy. The amendment concerned people inhabiting the degraded areas and promotion of commercial plantations, but the strict conservation regulations that prohibited settling, cultivation, cutting of trees and collection of forest products remained. In addition to these forestry acts, the 1992 National Environment Quality Enhancement and Protection Act has connections also to the forest areas because it enables the Ministry of Science, Technology, and the Environment to gazette environmental protection zones and because it can supplement forest conservation laws. (Rayanakorn 2000, 252–4).

The 1941 Forest Act defined the forest very broadly: as land not entitled under any Land Acts. The National Forest Reserve Act in 1964 included a somewhat more detailed definition by including physical geographical areas. (Rayanakorn 2000, 251–2). According to the National Forest Reserve Act of 1964, the forest means "the land which includes mountain, creek, swamp, canal, marsh, basin, waterway, lake, island and seashore", which is not entitled under any Land Acts (Boonboothara 1995). Determination of forest land is based on information derived from satellite imagery interpretation by the Royal Forest Department (Thammincha, cit. in Lund 2000).[11]

One aspect of the forest policy and legislation in Thailand has been the national security. This was apparent particularly in the 1970s when communism was emergent and anti-government insurgency occurred especially in forested border areas (Luukkanen 2000). The Border Patrol Police that has also been called Forest Police was, though, established already in the 1950s, and it is still responsible for controlling, apart from border areas, also other remote areas and their inhabitants (Buergin 2000, 7). One underlying reason already at the time of establishment of this police was a fear of communist liberation movements that were regarded as a threat to national security (Pragtong & Thomas 1990, 170). The government counter-measures against insurgency in the 1970s, including road construction and looking the other way of illegal logging, lead, however, to destruction of forests (Luukkanen 2000). Actual measures to conserve the forests through legal control began only in the 1960s, starting from the National Park Act. The Forest Act of 1941 concentrated on production and included no particular conservation-oriented objectives, and it has only minor relevance today (Rayanakorn 2000, 247, 251).

3.3 Policy regarding land

Communities took care of their forest and land areas collectively according to their own traditions until the end of the 1800s when the forest land in the North was mainly under feudal chiefs' possession. Since the foundation of the RFD at the end of the 19th century, all forest land has, according to the law, belonged to the State. (Makarabhirom 2001, 205–6). Forests were, furthermore, nationalised by 1960, which meant the end of foreign forest concessions (Lakanavichian 2001, 9).

[11] One of the international definitions for forest is that by FAO for the Global Forest Resources Assessment 2000: Forest is defined as land with tree crown cover of more than ten percent, and a tree height of at least five meters. An important distinction is made between closed (>40% crown cover) and open (10–40% crown cover) forest. (FAO 2000).

The starting point of the Thai land policy was the full land rights of the state, which grants rights to organisations and individuals (Hafner 1990, 83). The Land Act of 1954 enabled the central government to allocate land rights for forest areas excluding, though, the National Forest Reserves. Traditional tenure systems still prevailed in remote areas although the Land Act defined a variety of land titles from full ownership to limited usufruct rights. (Neef & Schwarzmeier 2001, 27). To obtain a land title under the Land Act, an application needed to be submitted within a given time (180 days). Land with no applications was regarded as unoccupied. Because many forest dwellers who were left uninformed were unable to give the required notification, they could obtain no possession rights. (Lindayati 2000). Those who reported their holdings received a temporary document called S*or kor 1*. After the amendment of the Land Act in 1967 these documents were no longer valid and their holders needed to replace them with a new certificate called *Nor sor 3*. Some *Sor kor 1* documents, however, still remained in regions where people relied on traditional systems. (Ganjanapan 2000, 139–41).

The land policy in Thailand has been often criticised. One source of criticism is the discrepancy between the Land Act, various civil codes, and traditional land systems. Differing interpretations of legislation, delays in implementing the Land Act, lack of funding, and continuity of traditional tenure arrangements have been blamed for contributing to deforestation and forest degradation. (Hafner 1990, 83–4). Tenure problems have been the worst in areas determined as forest reserves, which cover 40% of the land area (Neef & Schwarzmeier 2001, 27). The Land Act together with the National Forest Reserve Act were the start of the conflict in land use over the forest and agricultural land. The Land Act defined use of the land as a means to obtain land rights; with increased population growth at that time it meant increased encroachment to the forests. Moreover, the National Economic and Social Development Plans from the 1960s until the beginning of the 1990s emphasised agricultural production and encouraged expansion of agricultural land. (Lakanavichian 2001, 8–9).

A conflict between an increase in protected forest area and people inhabiting in and being dependent on these forests for their livelihood was soon recognised to require some solution. The government, although it considered settlement in these forests as unsustainable, prepared in 1985 guidelines for the land rights of the communities within the forest reserves: Those who had stayed in the area before 1967 were entitled to land right documents under the Land Act. The community settlements established between 1967 and 1975 were entitled to usufruct rights, and those established after 1975 could have the right to live and harvest in the forest for a defined period that varied from five to thirty years. Usufruct rights were given under the SOTHOKO (or *Sor-tor-kor*) Project (1982–93). In addition, a project to allocate land to the poor in degraded forests was started (the KOJOKO, or *Kor-jor-kor*, Project, 1990–92). This project aimed at relocating people from the conserved to degraded areas by allocating them a plot of land to a maximum of 15 *rai*[12] (2.4 ha) per household, which, however, proved to be inadequate, particularly on poor soils. In the SOTHOKO Project, people living in degraded areas were given the right to continue living and using the land, the maximum size of which was 20 *rai* (3.2 ha) per household, or up to 35 *rai* (5.6 ha) if trees were planted. (Rayanakorn 2000, 248–50).

3.4 Vanishing forests

Of Thailand's land area, 51 million ha, a total of 26 million ha was classified as permanent forest area according to the Cabinet Resolution of 1961 (Rayanakorn 2000, 281). This category of permanent forest area is larger than the forest reserve area, which is protected by the law instead of a Cabinet resolution (Sato 2003). The actual forest area is, though, considerably smaller (17.2 million ha) covering about 33% of the land area according to a preliminary forest land use assessment of the RFD (2001). This estimate is based on visual interpretation of satellite images and lacks ground verification. Due to this, the percentage of

[12] *Rai* is a unit of measurement for area used in Thailand; 1 *rai* is equal to 0.16 hectares.

the forest area is higher in the recent statistics than previously, which can be seen also in Figure 3. The FAO (2001) reports a lower figure for Thailand's forest cover, 29%, which is based on the global forest resources assessment in 2000. Forests are, anyhow, unevenly distributed and of the five regions the North has the largest forest cover (Fig. 3); more than half of the country's forests are found in the North (RFD 2001).

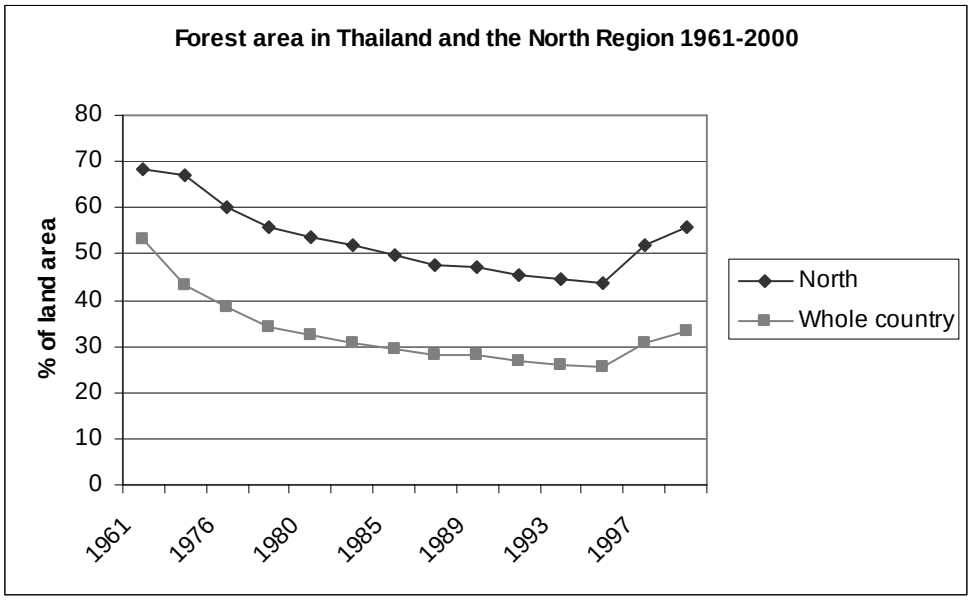

Figure 3. Percentage of the forest area in relation to the total land area in Thailand and in the North Region (data source: RFD statistics 1983–2003).

The National Forest Reserve Act enabled the government to designate forest reserves without a Royal Decree. This, however, resulted in large areas classified as forest reserves but actually lacking forest cover. In the late 1980s, the RFD started to implement a zoning system in the forest reserves, and the lands were divided and gazetted into three groups: conservation, economic and agricultural zones. The criteria used in this zoning were arability, forest cover and forest condition. The conservation zone was defined as land with healthy forest cover and the economic zone as an area with degraded forest but with soil unsuitable for growing rice or upland crops. The agricultural zone, also called the land reform zone, was specified as the deforested area that had permanent settlement and where the land was used for agriculture. The jurisdiction of these lands was largely transferred from the responsibility of the forest sector to the agricultural administration (Agricultural Land Reform Office). This, however, has caused some conflict within the administration because of interests towards these lands as potential plantations sites on the one hand, and as land to be allocated to the landless on the other. Furthermore, according to an agreement made in 1995, land classified as forest ought to be returned to RFD control. This has increased the tension because the Agricultural Land Reform Office had no obligation to return the lands. (Sato 2003).

Thailand's forest resources were used extensively before the end of the 20th century. The RFD had a forest production unit, Forestry Industry Organization (FIO), since 1947. It became independent from the RFD in 1956 and was transferred to the Ministry of Agriculture. This unit extracted a considerable share of timber logged from the Thai forests and was also involved in silvicultural forest management. A need for a government wood processing unit led to the establishment of Thai Plywood Company in 1951. Logging concessions were allocated also to foreign companies. Local loggers were granted a royalty freedom to harvest provided that the harvest was not exported. This was, however, limited in 1960, and the royalty freedom could

be permitted only for household consumption. In 1967, the objective of reserving 50% of the land as forest was dropped to 40% because the forest cover had already shrank below 50%. A change in policy started in the 1970s, when the new projects were mostly directed to the reserved forests. (Pragtong & Thomas 1990, 169–73).

Deforestation was rapid during the 1960s and particularly in the latter half of the 1970s and the early 1980s. Forest management focussed on economic development. The rate of deforestation at that time was up to 3.85% per year, which was among the highest rates in tropical forests, and, as a result, the forest cover has roughly halved since 1960. By the end of the century, the rate of yearly loss, however, clearly decreased. (Chan 1995, 14; Lakanavichian 2001, 6). Annual rate of deforestation during the 1990s was -0.7% corresponding to a loss of 112,000 ha of forest each year (FAO 2001). Anyhow, change of forest cover between the years 1980 and 2000 was estimated to be -20.7% (Thammincha 2003). Economic crisis of 1997 increased the rate of deforestation (Lakanavichian 2001, 52). Although 5.4 million *rai* of trees were planted between 1906 and 1996, the pace of deforestation – 89 million *rai* – exceeded reforestation manifold. The conservation policy of the past two decades has been unable to reverse this trend even if some deceleration of the forest loss has been achieved. (Kaosa-ard 2000, 3–6).

Commercial forestry has taken place in the North already for more than 140 years, but because the mountainous terrain in many places is difficult to access, the losses in forest cover were for long lower than those in other regions of Thailand. Deforestation, however, became a problem because as a result of logging activities human settlement spread to these areas. Improved infrastructure, which served both economic and political purposes, enhanced access to the northern forest areas and attracted also other economic activities. Consequently, a considerable increase in forest loss took place during the first half of the 1970s. (Kaosa-ard 2000, 3–4). Road building increased the encroachment of forests and the deforestation rate in northern Thailand although it was even more important in the South, Central and Northeast Regions than in the North. Access to markets and population density have contributed to forest clearance. (Cropper et al. 1999; Cropper et al. 2001). Furthermore, farmers sometimes sold the agricultural land to non-local investors and cleared new land for farming, as happened, for example, in Chiang Mai Province (Chan 1995, 14). Clearing of new lands is at present illegal but with the current system it is difficult to control in remote areas.

Although local people are the primary group of forest users now after the revoking forest concessions, indirect or secondary forest exploiters affect the use of forest resources. These include the RFD, NGOs (non-governmental organisations), non-residential land owners, and people outside the forests demanding products and services of the forest. (Chan 1995 14–15). Development schemes of the government have also resulted in deforestation, for instance, because companies and lowland farmers were encouraged to move to the uplands (Delang 2002).

In brief, the most obvious reasons for deforestation have been logging and agriculture. Before the national logging ban in natural forests in 1989, unsustainable legal logging and large-scale illegal logging caused deforestation (Delang 2002). Illegal logging increased especially at the turn of the 1960s and 1970s when the number of concession increased and both concessionaires and villagers conducted logging illegally. Besides them, deforestation was largely caused by influential people and officials who benefited from illegal logging. (Ganjanapan 2000, 41, 60).

Expansion of agricultural land also for subsistence but even more, and increasingly, for commercial farming has caused forest loss. A market demand for temperate crops that thrive in uplands has been a strong incentive to clear more land for agriculture (Delang 2002). In addition, for example mining, building of dams, and an improved road network have contributed to deforestation. Underlying reasons include poor policy planning, implementation and coordination, and lack of adequate training and research. (Chan 1995, 16; Lakanavichian 2001, 39–40). Reasons underneath are also related to international markets and imbalances in economic growth and distribution (Neef & Schwarzmeier 2001, 13). All in all, deforestation

is a complex process with no single reason, and also in Thailand it is today widely admitted that rotational slash-and-burn cultivation, which was used as a scapegoat (and which will be further discussed in Chapter 5), cannot be solely blamed (Luukkanen 2000).

3.5 Effort to combat deforestation with a national logging ban

The history of the logging ban began already in 1979 when a partial ban was enacted. Its aim was to ensure a long-term wood supply by increasing reforestation and reducing logging by 50%. In practice, this meant that the logging concession areas were divided into two halves and logging was banned in the other half. In addition, the staff was increased for strictly conserved areas, and sub-contracts in Forest Industry Organization's concessions were forbidden. (Thammincha 2003). Thus, this partial ban had practically no effect on forest-use of local communities. The final straw for the government preceding the decision on the national logging ban on all natural forests was the exceptionally devastating flooding in the South in 1988, of which deforestation was accused. The ban was pushed through exceptionally fast, which reflects the seriousness with which the issue was taken.

A report by the FAO Technical Cooperation Project supported the justification behind the decision on logging ban by defining deforestation as one of the causes of this disastrous flooding along with topography, soil conditions, and abundant rainfall within a short time. Thus, the first objective was to protect the natural forests in upland watershed areas. (However, in mangrove forests, the concessions were revoked only in 1996.) (Lakanavichian 2001, 16–18). The perceived hydrological effects of forest loss, including reduced precipitation, increased sedimentation, more severe flooding in the rainy season and drought during the dry season, were the reasons for the logging ban that were clearly manifested in public. Nevertheless, other concerns existed underneath. Perhaps the most important reason was the fear that deforestation would eventually threaten economic growth (Enters 1997; Delang 2002).

The impact of deforestation on hydrology is a complex issue. In particular, the influence of deforestation on precipitation and drought is a controversial topic (Tangtham 1994; Forsyth 2001; Walker 2003; ETFRN 2006). Several recent studies have showed some correlation between deforestation and precipitation (Shinjiro et al. 2001; Voldoire & Royer 2004). On the other hand, the degree of impact is often found as relatively low. L. A. Bruijnzeel (2004), for example, concludes that the effect of forest conversion on rainfall is minor; eight percent decrease when the forest is converted to grassland and even less in maritime climatic conditions. In the case of slash-and-burn cultivation, which has been blamed for much of deforestation in Thailand, the effect on hydrology is further diminished because the area is left to regenerate after a cultivation period. Despite the fact that studies have indicated that the of monsoonal climate has a dominant impact on rainfall in Thailand (Shinjiro et al. 2001), the perception that forests have an overall positive impact on hydrology is widely spread. In fact, the strategy of linking forest protection and water availability with forestry decisions has proved successful in government campaigns. (Kaosa-ard 2000). Furthermore, local effects and alterations in the variability of rainfall even without a change in mean precipitation can be significant for local farmers (Voldoire & Royer 2004).

Effects of deforestation on the surface flow and infiltration that are linked to land degradation depend on site but, generally, the long-term infiltration is reduced when the forest cover is removed, and if the rains during the rainy season are inadequate to replenish the groundwater reserves, the dry season flows decline notably. (Bruijnzeel 2004). Conversion of forest to grassland typically increases the total water runoff (FAO 2005a, 4–5). Deforestation, especially when followed by soil disturbance and compaction, increases the peak flows, although the effect is more insignificant where the annual precipitation is high. When the precipitation is low, forests are able to reduce the runoff locally. The impacts are, anyway, local: sub-watersheds may differ notably, and characteristics of one sub-watershed cannot necessarily be generalised to the entire watershed. Thus, conclusions on larger-scale effects cannot be drawn directly. (Bruijnzeel 2004; FAO 2005a).

Reasons for local down stream environmental impacts in Thailand are many; for example, the rural road network with many unpaved roads increases run-off and sedimentation (Ziegler et al. 2004). It, furthermore, appears that no significant difference exists between disturbed and deforested areas in increasing peak flows, but a permanent change from forest to the farmland seems to cause changes in the annual water yield. What is commonly agreed is that forest cover prevents soil erosion. (Bruijnzeel 2004). Forest loss decreases the soil infiltration capacity and, hence, increases the run-off and the soil erosion rate (Purwanto & Ruijter 2004).

The viewpoints of the studies may, furthermore, differ. While the Thai government has viewed the erratic water supply as a central problem, Andrew Walker (2003), for instance, stressed another aspect of the problem. His main argument is that instead of focussing only on water supply, it is crucial to consider the increased water demand, particularly of the new agricultural systems, both in uplands and lowlands, when assessing the hydrological impacts of land use change. According to him, the area of rain-fed hill-slope cultivation has actually slightly diminished, and those fields are now permanently cropped. He ends up stating that no hydrological evidence exists on any significant impacts of deforestation on long-term rainfall and only a minor effect, if any, can be found on the water flow in the dry season. Another view is represented in the report of the Technical Committee of Thailand National Hydrology Committee in 1989, which states that deforestation increases the fluctuation in water flow in down- and upstream. Hence, Nipon Tangtham (1996) stresses the importance of focussing on upstream activities when addressing the water resource problems. This view easily provokes conflicts between uplanders and lowlanders over water resources.

The logging ban resulted in a decrease in the rate of forest loss although a decline in cash crop prices also contributed to this at the time of imposing the ban (Griffen 2001, 62). Despite the ban, however, deforestation has continued as described earlier. Since the logging ban, the rural inhabitants have been the main users and managers of the forest resources (Chan 1995, 14). Nevertheless, the remaining forests are protected by law, and almost all activities in natural forests are illegal. For instance, gathering of such forest products as honey, resin, wasp eggs and rattan, is prohibited by law. Collection of many other forest products for household consumption is, nevertheless, allowed. (Nalampoon 2003, 304).

The main consequence of the logging ban was probably that management objectives in the natural forests officially shifted towards conservation, and the era of commercial exploitation ended. Plantation forestry and rubber-wood utilisation also received more attention as alternative solutions. The new Constitution of 1997 reinforced this focus on conservation (Roth 2004b), and the related Policy Statement emphasised the control of the strict compliance of the law in the use and rehabilitation of natural resources. It also suggested that zoning, for example, of community and protected forest areas needs support. (Policy Statement 1997).

Besides shifting the emphasis of forest management towards conservation, another impact of the national logging ban was that it transferred the policy focus increasingly towards community-based forest management (Poffenberger 2000, 53). On the other hand, it has increased illegal logging in the neighbouring countries Laos, Myanmar, Cambodia, and wood imports from those and other countries. For the government the ban has meant a decrease in tax revenues and royalties, and an increase in expenses, because of implementation of new management schemes, reforestation, training, and institutional restructuring. (Thammincha 2003). For many workers within the forest industry, the logging ban meant unemployment. The Forest Industry Organisation, which has been a semi-private corporation after becoming separate from the RFD organisation, has fallen into financial trouble and has become dependent on financial support from the government. All in all, regarding all the impacts of the logging ban, it is now considered somewhat unsuccessful despite the improved system of protected areas. One reason was pushing the law through so rapidly that it left practically no time for planning and preparation (for instance of supportive legislation), which would have

helped at least to some extent to avoid problems of implementation. (Lakanavichian 2001, 46–53).

3.6 Thai Forestry Sector Master Plan

The government's concern of deforestation also resulted in the preparation of a Thai Forestry Sector Master Plan, which started in 1991, two years after imposing the logging ban. The Master Plan was funded by Finnish development aid, the Asian Development Bank, and prepared by the RFD, which was the lead institution. It is a plan for national-level decision-making based on the National Forest Policy, but it is aimed to be implemented through local level plans. The plan was finalised in 1997 with National Forest Policy Committee's request of a few amendments and updating in order to present it to the Cabinet for approval. (FAO 2000).

The policy objectives to update the 1985 National Forest Policy listed in the Master Plan are: to reverse the trend of environmental degradation, rehabilitate deteriorated watersheds, promote social justice in forestry development, improve self-sufficiency in forest produce, strive for economic strengthening at local and national levels, and support combat against global warming (Thai Forestry Sector Master Plan 1993a). The purpose of the Master Plan is to encourage bottom-up planning by providing opportunities to participate for NGOs, POs (people's organisations) and other local level organisations, which are expected to represent the local people, and by distributing decision-making power over community forest areas to the local communities (FAO 2000).

Some NGOs have, however, criticised the Master Plan for a top-down approach and for lacking adequate measures for meaningful public participation. They have also blamed the plan for favouring the elite and increasing the marginalisation of rural communities by encouraging privatisation of the state forests and promoting plantations. The view of the critics is that the implementation of the plan induces conflicts between industry and the rural poor and that it fails to address land right issues and to question the existing policy. (IUCN 1996). This strong criticism, particularly from a few environmental NGOs, has hindered the implementation of the Master Plan (Lakanavichian 2001, 17). Less outspoken critiques acknowledge the good intentions of the Plan but have doubts on its implementation. The IUCN review (1996) of strengths and weaknesses of the Plan recognises considerable improvements of the Plan during the preparation process but notes that positive recommendations on local people's and communities' participation require further clarification in order to be turned into a policy. Recognition of the potential of community forestry and inclusion of the people, environment, biodiversity and the idea of a new Forestry Code were regarded as the main strengths of the Master Plan. The major weaknesses reported in the review included omissions of land tenure issues, the recognition of customary rights, the role of state with respect to private sector, and ecosystem conservation.

The Master Plan has been acknowledged for recognising the need for participatory planning and management, including periodical revision of the goals, and attempting to find solutions to the appeared problems of forest management. (Chan 1995, 21). It also recognised the capacity of local people to manage the forests in a sustainable manner if the conditions are favourable (Thai Forestry Sector Master Plan 1993a), which can be considered as a basis for policies to support people's participation. The Master Plan was never officially enforced but it has affected the forest policy development in Thailand.

3.7 National forest policy since 1985

A National Forest Policy was approved in 1985. Before that, no comprehensive forest policy existed (Kaosa-ard 2000, 5). The policy contains objectives for the long-term guidelines of forest management to ensure national and social benefits, and national security. The aim is to guarantee the preservation of 40% of the land area as forests, consisting of 25% of

conservation and 15% of production forest (originally the percentages were defined as vice versa but with the national logging ban they were changed, Lakanavichian 2001). The policy also designates land with a slope of 35% or more as forest land that can have no title deed or land use certificate. (Sutthisrisinn & Noochdumrong 1998). Conservation forests were defined to comprise the protected watersheds (Class 1, which is strictly protected), national parks and wildlife sanctuaries. Their purpose was prescribed as to protect from hazards, such as flooding and erosion, to conserve the environment, soil, water and wildlife, and to serve as sites for recreation and research. The aim of production forests was to produce wood (referring to planted forests) and other commercially valuable products. (Rayanakorn 2000, 249).

The policy was to encourage planting of production forests and promote reforestation. The aim was also to promote extension efforts, so as to create public awareness and raise positive attitudes and develop skills in the sustainable use of forest resources. In addition, the policy emphasised the importance of promoting efficiency and reducing the risks of agricultural production in order to avoid encroachment of agricultural land to the forests. This aspect is stressed also in the objective to establish guidelines to solve problems caused by shifting cultivation, forest fires, and forest clearing by the upland minorities. (Sutthisrisinn & Noochdumrong 1998; FAO 2000). Upland minorities are probably referred to also in the goal of ensuring national security. About the same time with the national forest policy, the hill tribe policy (1984), and a few years later the national land policy were formulated, which both had connections to policies on forest lands (Makarabhirom 2001, 208).

The seventh National Economic and Social Development Plan 1992–1996 addressed the role of local communities in natural resource management and brought up the connection to rural poverty (Poffenberger & McGean 1993, 4). The five-year-plan for 1997–2001 (8th National Development Plan) aimed at protecting the forests from illegal logging and forest fires, increasing the forest area through rehabilitation and reforestation, searching for solutions to land tenure and forest problems, training of officers and target groups in forest management, and at distributing information about forest conservation (FAO 2000). Thus, both of these plans focussed on conservation forests and omitted any plans to promote production forests (Rayanakorn 2000, 249).

The ninth plan for the years 2002–2006 has continued the emphasis on protected areas and includes people's participation "as a strategy to implement policies and ensure sustainability" (Jintanugool 2002, 103). Conservation and participation are central elements also in the criteria and indicators of sustainable forest management. The government approved a national set of criteria and indicators in 2001, but their implementation is still at an early stage although projects have been launched to develop criteria and indicators for community forestry. Moreover, certification efforts for timber production have proceeded slowly. One justification to oppose certification has been the logging ban in natural forests. (Markopoulos 2003, 50–54).

3.8 Protected areas system

To protect Thailand's natural resources, the government started to plan a national parks system in 1959, and in 1961 the National Park Act was passed. Pa Doi Inthanon in Chiang Mai Province was among the first four national parks, in addition to which ten areas were at the same time gazetted as protected forests according to the Wildlife Conservation and Protection Act. A national parks committee was established to advice the Prime Minister. In 1989, the King made an amendment to the National Park Act, which prohibited basically all activities in national parks and allowed the conversion of national reserve forests to national parks. (Sutthisrisinn & Noochdumrong 1998)

National parks and wildlife sanctuaries covered less than one percent of the land area at the end of the 1960s but already by 1980 their share had increased to six percent (Pragtong & Thomas 1990, 172, 175). The increase in protected area has continued (Fig. 4). The number

of national parks in 2003 was 103 (RFD 2003) covering about ten percent of the country's land area, and several new parks were under planning. In addition, 58 forest parks were gazetted, and, furthermore, 55 wildlife conservation areas and 56 non-hunting areas existed under the Wild Animal Reservation and Protection Act. Botanical gardens (numbering 16 in 2003) and arboreta (55) are also included in the protected area system. Protected areas covered about 18% of the land area in 2003. (RFD 2003). This refers to the area conserved under laws and cabinet resolutions. Furthermore, additional conservation areas exists within the national forest reserves, which cover a considerably larger area than the gazetted protected areas, and in the forest reserves and conservation forests pending to be gazetted. The forest reserves have less strict rules than the sites with a protected area status. (Lakanavichian 2001, 10–11).

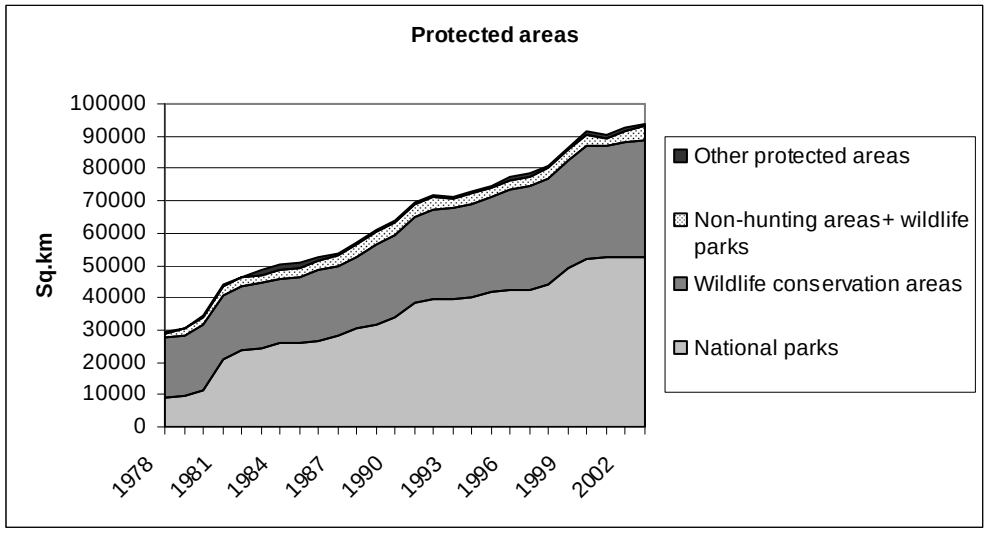

Figure 4. Protected areas of Thailand in 1978–2003 (data source: RFD statistics 1983–2003). (Other protected areas consist of forest parks, botanical gardens, and arboreta).

Classification of watersheds into five categories, for which a special Watershed Classification Committee was established in 1992, is an integral component of the protected area system. Watershed classes 1A and 1B are areas with a slope of more than 60%. They are totally protected from utilisation also including a prohibition of settlement. Watershed class 1B has somewhat less strict rules because it is defined as a degraded area. The aim is to reforest as much of this area as possible or maintain it under permanent agroforestry. Other categories of watersheds (classes 2–5) allow logging and other uses to a certain extent. (Lakanavichian 2001, 43–44). Of northern Thailand, about 30% of the land is under watershed class 1A and 3% under class 1B, in addition to which about 15% belongs to class 2. The rest falls under classes 3–5. This classification is made according to five criteria: slope, elevation, landform, soil and geology. The watershed classes are described as follows (Tangtham 1996):

1. Protected forest in headwater source:
   1A: Strictly protected forest usually at high elevations with very steep slopes.
   1B: Physically similar to 1A but partially cleared for agriculture and soil protection requires special attention. Planting of trees in this area is encouraged.
2. Commercial forests, where logging and mining is allowed, at high elevations with steep slopes but less susceptible to erosion than the areas under class 1.
3. Fruit tree plantations in uplands with steep slopes that can be used for commercial forests, fruit trees, grazing, or certain agricultural crops provided that soil conservation is taken care of.
4. Upland farming in gentle slopes with a moderate requirement for erosion control.
5. Lowland farming in gentle slope or flat area with only few restrictions.

Since the logging ban came into operation, the primary goal of Thailand's forest management has been conservation. The most important strategies to achieve this goal include: increase in the protected forest area, stricter control of conforming with the laws, relocation of settlements from the conserved forests, and efforts to stop encroachment of new areas in uplands including a special emphasis on ethnic minorities and bringing rotational slash-and-burn cultivation to a halt. (Lakanavichian 2001, 14). In practice, the plans to enlarge the protected areas and to stop the rotational farming systems have raised concerns at the local level over people's livelihood. In particular, the intentions to relocate villages have caused resistance. The solution suggested in the Master Plan is to limit the relocation plans to only a few necessary cases and, instead, to encourage people to find alternative livelihood outside the protected forest (Thai Forestry Sector Master Plan 1993a).

The plans to establish new protected areas, particularly national parks, concern mainly the northern region and, therefore, inevitably affect many upland dwellers. This is, nevertheless, in conflict with efforts of some RFD departments and the Ministry of Interior to promote the community participation in forest management that is included in decentralisation programmes. As long as a community forestry law is lacking, the current conservation policy is inconsistent with community rights manifested in the Constitution. (Poffenberger 2000, 55–57).

The National Park Office (2004) has identified some problems regarding the national parks. Firstly, because of unclear boundaries of the parks, migration and the existing settlements within the boundaries are difficult to control. The solutions are going to be considered from case to case, and they include relocation, adjustment of the park boundary, establishment of a buffer zone and implementation of community forestry. Secondly, another problem is the inadequacy of skilled park workers; the number of national parks has increased but the number of staff has not increased to keep pace with the change. Furthermore, a lack of skills may result in mistakes in management. Thirdly, the problem is that about half of the parks lack a management plan. Moreover, research and education, which are important functions of national parks, lack funds. Fourthly, coordination of development projects, such as construction of dams, and protected area management are inadequate, and conflicting interests exist. (National Park Office 2004). In addition, the findings of Maureen Cropper et al. (2001) from northern Thailand suggest that actually the protected areas have no significant effect on reducing the likelihood of forest clearance unless they are supported by the local communities and the livelihood of their residents is adequate without encroachment to park territory. It is also problematic that the national parks lack buffer zones and, in practice, the boundary areas tend to function as a buffer zone. (Cropper et al. 2001).

The potential of the protected areas in ecotourism has also been recognised. Ecotourism projects have been implemented since the end of the 1990s in several national parks and wildlife sanctuaries. These projects have tried to involve local people. (Pragtong 2000). However, problems, both social and ecological ones, tend to appear when an increasing number of people visit the protected areas; shortage of staff, for example, makes controlling difficult (National Park Office 2004). Nevertheless, tourism, together with the availability of economic assistance, has encouraged the enlargement of protected areas (Sato 2003).

3.9 Reforestation

Reforestation has been included in the National Development Plans since the 1970s (Griffen 2001, 63). The first forest plantation, however, was established already in 1906, and by 1980 the plantation area had increased to almost 160,000 ha (Nalampoon 2003, 297). Joint reforestation by the RFD and the private sector was particularly vigorous at the end of the 1970s and in the early 1980s, after which the annually reforested areas decreased considerably (Lakanavichian 2001, 12). The main objective of reforestation was to rehabilitate the degraded forests, particularly in the watersheds. In addition to timber production, tree planting has thus had amenity and aesthetic purposes. (Nalampoon 2003, 297).

Budget deficiencies have forced the RFD to reduce the target of reforestation, to one third between 1982 and 1991 (Kaosa-ard 2000, 6). In 1992, commercial reforestation actually ended, which was reflected in the total area of annual reforestation. Local people and NGOs had complained that monoculture plantations were insufficient to provide biodiversity benefits for the locals and were considered to be competing for land resources with agriculture and diminishing local people's income generating options. Instead, the government started to encourage the establishment of small-scale private plantations. (Lakanavichian 2001, 12–13). A five-year reforestation campaign was started in 1994 to rehabilitate degraded watersheds, protected areas, roadsides, riverbanks and urban areas (Pragtong 2000).

Two types of reforestation projects exist: protective and productive reforestation. In the north, the main species planted are native pines (*Pinus kesiya* and *Pinus merkusii*) and teak (*Tectona grandis*). Primarily, the RFD and the FIO have carried out reforestation projects but the private sector is also encouraged to start its own projects. Private sector projects, however, often have conflicts with local land users. Local communities have been involved in the projects, but when the impacts of the projects have been evaluated, social benefits have usually been reduced to effects on local employment.

The social objective of reforestation projects to provide income generating opportunities for rural people has not been achieved. (Griffen 2001, 81–82). In addition, planting of eucalypts has encountered opposition at the local level because these species are generally suspected to cause water scarcity. By and large, the policy of promoting commercial forest plantations has been viewed to induce inequality and benefit only large enterprises. (Rayanakorn 2000, 249). However, now that wood shortage is expected to be an increasing problem, the establishment of forest plantations is going to be encouraged again, and also some native tree species have been introduced to plantations (Nalampoon 2003). Rubber plantations, moreover, provide presently much of the wood for mechanical forest industries and they are expanding to new areas, such as the North.

3.10 Striving for decentralisation and people's participation

Thailand is a constitutional monarchy. The era of absolute monarchy ended in 1932 resulting in the removal of the legislative power from the king (Lakanavichian 2001). Administratively the country is divided into four regions, the North, Northeast, Central and South. These regions are divided into 76 provinces (*changwat*), which are further divided into districts (*amphoe*). The districts are comprised of sub-districts (*tambon*), which contain villages (*moo/ muban/* in the village names *ban*).

Along with the establishment of the RFD, the central government gradually expanded its rule from teak to other forests and to other fields of natural resource management. The involvement of local communities was basically limited to regulations, taxation and supply of labour. (Pragtong & Thomas 1990, 168–71). During the 1970s, when the government took actions against communism, gaining the support of the inhabitants of remote areas was important, and the government started several social forestry projects (Luukkanen 2000). The introduction of the Forest Village concept and launching of the Hilltribe Forest Village Program in 1977 expanded the RFD mandate to rural development (Pragtong & Thomas 1990, 173). A substantial turn in the forest policy, however, took place along with the logging ban. It was no longer possible to ignore the need for people's participation in forest management.

The RFD viewed the lack of control over migrant settlers and loggers in the North and Northeast as one reason for rapid deforestation during the 1960s and 70s. On the other hand, the concessions and plantations required labour also in the remote regions. Hence, the RFD started in the late 1960s to work with local communities to ensure the supply of labour. The Forest Village Program was started in 1975 (and continued up to 1993) as an attempt to include communities in forestry activities. The Forest Village Program provided infrastructure and services but granted usufruct rights rather than land titles, and the use rights were limited to 2.4 hectares per household (Hafner 1990, 82). Within the programme, communities were

relocated from the state lands to selected forest areas to supply labour for forestry. This, however, proved to be slow, costly and problematic, and only few communities were involved. (Poffenberger 1990, 18).

Relocations within the Forest Village programme for the hill tribes caused discontent and resistance (Lakanavichian 2001, 20). Despite that, however, several years later the Forest Land Resettlement Program was started, first in the North and Northeast. The program used Thai military to relocate people from the protected areas and watersheds defined as critical to reforest large areas with fast-growing tree species such as eucalypts. Strong resistance and hard critiques resulted in revoking this program in 1992. (Poffenberger & McGean 1993).

The Forest Village Program operated under the National Forest Land Management Division of the RFD, which was established in 1975. This Division was responsible also for the National Forest Land Allocation Program, known as the STK Land Certificate Program, which started a few years later, at the beginning of the 1980s. (Hafner & Apichatvullop 1990, 191). STK was basically similar to the Forest Village Program; both were directed primarily to illegal residents in the forest areas. These programmes were aimed at restricting encroachment of forests for farming activities and their degradation through permanent settlement. Encouraging people to settle permanently was thought to enhance the national security. However, also unwelcome results followed: increased immigration to the forest areas and degradation of the forests occurred. (Pragtong & Thomas 1990, 180; Poffenberger 2000, 54). Some immigrants cut timber for building rough-framed houses and after two years legally sold the timber. In addition, unsustainable and illegal harvest of forest products occurred. (Chamruspanth 1993, 93).

Political decentralisation to sub-district level

In order to improve the effectiveness of the Forest Village and STK programmes and to find alternative solutions for resettlement in the northern uplands a programme called the Thailand Upland Social Forestry Project was launched in 1987. It included cooperation with universities and local communities, which were involved in land use planning for defining the potential for community participation in the management of surrounding forest reserves. (Pragtong & Thomas 1990, 180–1). The objective of this project was to create practical tools for RFD officials to work with local people in order to prepare mutually acceptable land use plans (Chan 1995, 20).

For a long time, the central government defined the forest-related policies – including, for example, upland development – without recognising the traditions or needs of the rural communities. The design of forest programmes was often concentrated on biological aspects while the socio-economic side was paid less attention, which sometimes made the programmes to fail. (Makarabhirom 2001, 202, 207). A decentralisation[13] process in natural resource management started in the mid-1980s when people's participation was included in the Seventh National Plan and in pilot schemes. At the beginning, the role of NGOs was significant in involving the local people in political debate, particularly in northern Thailand. (Tan-Kim-Yong 2002). However, both the National Forest Policy of 1985 and the Land Reform Act (1975, amended in 1989) failed to answer the question of how to transfer the forest management rights and responsibilities to communities in practice (Poffenberger 2000, 54).

Actually, the TAO (Tambon Administration Organization) Act of 1994 was the real starting shot for the decentralisation process. It provided the local administration with more power in forest use and planning and in practice meant that each of more than 7,400 tambons have

[13] Decentralization can be defined broadly as any act taken by the central government to transfer power to lower levels of the political hierarchy (Ribot 2002, 4). The process in Thailand can be more precisely described as political or administrative decentralization referring to transfer of power and resources within administrative hierarchy (Dupar & Badenoch 2002, 3, 7; Ribot 2002, 4).

their own TAO[14]. Responsibilities of these TAOs cover many issues, such as education and health, in addition to natural resource management, the purpose of which is "protection and wise development of all land, water, and forest resources" within TAO boundaries. The preparation of TAO plans is based on villagers' project proposals. (Dupar & Badenoch 2002, 12, 31). Apart from sub-district level (TAO), the authority of the administrative bodies at provincial and municipal levels and that of some special administrative bodies has increased (Policy Statement 1997).

In 1999, the Decentralisation Act was passed. It enacts the shifting of many responsibilities to the TAOs and emphasises activities in forest reserves (except for the protected areas), fire management in the forests, and community forestry. (Makarabhirom 2001, 212). To implement decentralisation, two national-level committees have been formed: the Committee of Decentralization and the Committee for Bureaucratic Reform (Tan-Kim-Yong 2002).

The principles of political decentralisation and participation were increasingly integrated into policy and planning during the 1990s, and the New Constitution in 1997 further promoted the process by giving the local institutions new responsibility to manage the natural resources (Makarabhirom 2001; Tan-Kim-Yong 2002). Local administrative bodies at provincial, municipal and sub-district levels as well as Thai citizens in general are encouraged to participate in forest conservation, rehabilitation and the management of community forests. The policy is to promote decentralisation of the environmental management authority to provinces and local communities by encouraging the communities and citizens to participate in the preparation of provincial environmental plans. Moreover, its aim is to promote the awareness of the general public, in particular the young, about the importance of natural resource and environmental conservation. (Policy Statement 1997). The constitution also aims at ensuring that the citizens have an access to environmental information and decision-making (Policy Statement 1997; Dupar & Badenoch 2002, 13).

The economic crisis at the end of the 1990s also contributed to the decentralisation process. The public sector adjustment designed to cope with the crisis aimed, on the one hand, at privatisation of activities and, on the other hand, at transfer of activities and responsibilities to local organisations. This referred, for example, to reforestation and conservation activities. (Pragtong 2000)

The government has encouraged participation, for example, with pilot projects, and by organising training on participatory tools, promoting local decision-making, sharing information, and co-operating with NGOs. As a result of this participation process, the number of ethnic minority group representatives, for instance, in the provincial level administration has increased. (Tan-Kim-Yong 2002). In forest management, the strategy aims at involving all stakeholders including the private sector, academics, ordinary citizens, and the government. The purpose is also to raise people's awareness and officials' motivation (FAO 2000). Furthermore, in addition to formal decentralisation efforts, people's own networks, such as watershed networks between the communities, may be significant in making proposals to local administrative bodies (Dupar & Badenoch 2002, 51).

In the northern uplands, natural resource management is, despite the hindrances, attempted to develop in connection with community development (Tan-Kim-Yong 2002). One important step in decentralisation of natural resource management would be enacting the community forestry law. Without this law, the situation will remain the same and the government will continue to maintain the power in managing all the forests, including the power to designate conserved areas (Doklamyai et al. 2001). Moreover, Mairi Dupar and Nathan Badenoch (2002, 13) argue that the new system striving for decentralisation is poorly in line with the traditional central governance of, for example, the RFD, and "instead of decentralizing decision-making, this shift emphasizes the role of forest officers in promoting central

[14] The governing body is a TAO council, which is consists of the sub-district headman (*kamnan*), core villages' headmen in the sub-district, a health volunteer, and two representatives from each of the core villages elected by the villagers (Care 1999).

directives at the district and village levels". However, also Dupar and Badenoch suppose that enforcing the Community Forestry Act may change the situation.

3.11 Preparation of the Community Forestry Act

The process of the Community Forestry Bill officially started in 1990 when the government formed the first committee to investigate the prospects of community forestry. A committee to draft the bill was appointed in 1991. Although the dilemma of community forestry and protected areas remained unsolved, the first draft bill was submitted in 1992 and the principle was approved in the Cabinet. Next year, it was followed by an alternative version, which emphasised commercial plantations and included only planted tree stands in community forests. Local people, however, opposed this emphasis because that would have given the RFD an absolute management power. Their suggestion was to focus on conservation rather than economic profits. (Doklamyai et al. 2001)

The main problem of the draft bill has been connected to the protected areas. In addition, other issues, such as the final decision-making power, have been debated. Nevertheless, the Cabinet approved the draft bill in 1996, after which it was submitted to public hearings. Along with the newly instituted legal mechanism that the new constitution of 1997 provided, some NGOs and people's organisations submitted their own draft of the bill to the Parliament in 2000. It was called the 'people's version' and it had the support of more than 50,000 people. (Makarabhirom 2001, 213; Thammincha 2003). Altogether, six drafts have been considered by the Cabinet. These include the cabinet version, 'people's version', and four drafts from political parties. Out of these, the Cabinet version has been selected and the others have been regarded as supporting documents (Luangjame 2005, pers. comm.).

In the debate concerning community forestry, three interest groups can be distinguished: 1) the government-centred group mainly consisting of officials and politicians, 2) the community-centred group including, for instance, NGOs, POs and academics, and 3) the national-centred group composed basically of environmentalists and urban residents (Makarabhirom 2001, 213). Some strictly environmental NGOs, often referred as dark green, and some officials are of the opinion that no community forests can be allowed in conservation areas and, even further, that the inhabitants of these areas should be relocated, or if that is impossible, the use of the conserved forest should be forbidden. The government's proposal to ban any logging and other uses in community forests within conserved areas was disapproved by a number of local people who live inside the protected forests. The issue of local inhabitants' land rights and the view that the existence of people inevitably leads to forest destruction seem to be the major sources of conflict. (Doklamyai et al. 2001).

In 2001, the bill was again amended and submitted to the Senate, which did not accept it as such, and, therefore, a specific committee to improve it was established. The Senate returned the bill to the House for reconsideration and approval of amendments in 2002. (Thammincha 2003; Luangjame 2005, pers. comm.). The modifications made by the Senate were related to the following issues: criteria of the accepted applicants for a community forest; possibility to expand the community forest, which was prohibited in the new version; and utilisation of trees and forest products from the community forest, which was unrestricted in the House version but was subjected to licence in the new version. (Sato 2003).

One critique of the bill regarded acceptable applicants: this concerned small communities' with fewer than one hundred inhabitants and the new groups' ability to apply (Sato 2003). In addition, concern was expressed on the definition of indigenous communities eligible to apply. Another critique that remained central related to the Senate's rejection to permit community forests in protected areas consisting of national parks, wildlife sanctuaries, non-hunting areas and other protected areas, such as watersheds and places with environmental value. These areas are occupied by a large number of people and their exclusion would weaken the effect of the bill considerably. (Sato 2003). To solve the disputes, in November 2004 the House set up a joint House-Senate Panel comprised of 24 members. This panel has prepared a final

draft which would allow community forests in protected areas on the condition that the villagers participate in conservation. The panel, however, failed to forward the final draft in 2004. (RECOFTC 2004b). In 2005, the panel consisting of Members of Parliament and Senators approved the draft bill, provided that the text will be modified. In this version, community forestry could be allowed in protected areas excluding the strictly protected ones, such as those belonging to watershed class 1. (Luangjame 2005, pers. comm.). In early 2006, the bill is still pending for the final approval.

Despite the fact that the Community Forestry Bill is still pending for come into operation, the RFD has launched several pilot projects. One of them is the involvement of local organisations in the management of buffer zone forests surrounding protected areas. Other pilot projects have included encouragement of small-scale forest plantations, promotion of local participation in conservation and fire control, and the guidance of TAO administration in forest management in cooperation with local forest officers. (Pragtong 2000). Nevertheless, community forests can presently be legally allocated only in economic forest zones although some unofficial agreements in conservation zones have been made. According to the RFD, community forests are prohibited in the protected areas and, furthermore, in the areas of "national interest". (Sato 2003). Despite the flexible unofficial arrangements, a number of communities wish that this unsettled situation will change with the anticipated community forestry law. Some doubts, however, even exist whether the law is ever going to be enacted.

3.12 Current forestry administration

Today, the tasks of the RFD include enforcement of the Forest Act and other related acts, promotion of natural resource conservation and forest rehabilitation, research and development of appropriate technologies for forestry and related fields, and functions as an implementing authority. In addition, its objectives are to improve the effectiveness of management and to reduce conflicts over natural resources. Recently, financial problems have reduced the RFD budget. (FAO 2000)

The RFD used to be responsible for all forest related activities until autumn 2002 when the Senate decided to separate production forests and protected forests under different bodies and, consequently, a reorganisation of the government bodies took place. At the beginning of 2003, in a new arrangement, the Royal Forest Department was transferred from the Ministry of Agriculture and Cooperatives to the new Ministry of Natural Resources and Environment, but it remains to be responsible for production forests, especially referring to plantation forests. Community forest management is also included in the RFD duties as the only field concerning natural forests. Responsibilities for protected forests were transferred to two Departments under the Ministry of Natural Resources and Environment. The new Department of National Parks, Wildlife and Plant Conservation administers the protection forests with its offices for national parks, watershed management, natural resources conservation, forest fire control and forest protection. Another new department, the Department of Marine and Coastal Resources, is responsible for the mangrove forests. (Thammincha 2003).

Despite a change of policy towards conservation, decentralisation and participation, suspicions towards the central administration and its capability (and will) to solve environmental problems have been difficult to dispel because of the burden of the past (Luukkanen 2000). The problems of top-down approach still prevail; for example, the public is often left uninformed about the details of the policies, and, on the other hand, the central administration lacks information of policy implementation from the field. Another problem is that the forest policy lacks continuity, and only temporary solutions may be provided. Furthermore, coordination with social and economic plans has often been inadequate. (Nalampoon 2003, 307–8).

4. MATERIAL AND METHODS

4.1 Approach

This study utilises qualitative research methods and methodology. This is due to the nature of the research question. The study of people's views and experiences is a research problem which lends itself to more qualitative types of research (Strauss & Corbin 1990, 19). When investigating people's conceptions, a qualitative approach is justifiable because, unlike quantitative research, it includes explanations of deviant cases as well. The people under study are not regarded as similar objects of uniform quality but informants different from each other who illustrate the research problem from varying sides (Alasuutari 1999, 38, 49). This is important for this kind of study in which different cultures are examined and cultural sensitivity is required.

The qualitative approach is selected for multifaceted investigation of the selected cases, which is required because of the holistic characteristic of the selected viewpoint of environmental literacy, including the values and understanding of natural processes instead of just familiarity with forest species. Environmental literacy has been studied in many cases by using quantitative approach in a survey-type of research with the aim to test the knowledge of a selected group of people, resulting in information on the group's concepts on very specific environmental questions. The present study views local people as a heterogeneous group, and the qualitative approach is regarded as more appropriate because it provides more detailed information and helps to conceptualise what lies behind human actions. The qualitative approach provides insights to problematic issues and a wider perspective to social, economic, historical and cultural circumstances for understanding local perceptions; it aids in explaining attitudes and practices relevant to the local context. (cf. Niemeijer & Mazzucato 2003).

The point of departure is that the social world is complex and multi-layered (Layder 1998, 132–72) and this is examined using case studies. Case studies are context-dependent but they can provide concrete and practical knowledge and a nuanced view of the issue studied. Particularly, when the topic is related to human perceptions and behaviour, which are not following any rules of theory, case study is an appropriate approach. (Flyvbjerg 2001). The primary purpose of these case studies is not to generalise but to describe the heterogeneous nature of the situation in the forested areas of northern Thailand.

4.2 Fieldwork in northern Thailand

The fieldwork for this research was carried out in northern Thailand, in rural villages of Chiang Mai Province, in the Districts of Mae Chaem and Chomthong, near to Thailand's highest mountain Doi Inthanon (Fig. 5). The fieldwork was carried out in three sections: the main part of the data was gathered during field trips in January-March and September-November 2002, and complementary information was gathered in November 2004. The interviews of villagers and NGO workers were carried out in Mae Chaem and Chomthong Districts, whereas the interviews of officials, academics and people from international organisations were conducted primarily in Chiang Mai town and in Bangkok. The fieldwork was concentrated on six villages although some other villages in the same area were also visited.

The northern part of Thailand is the most densely forested region of the country. It is mainly upland area; lowlands constitute only ten per cent of the area. The three main types of forest of northern Thailand, according to the classification of the Royal Forest Department, are the dry dipterocarp, the mixed deciduous and the evergreen forest (including tropical evergreen, hill evergreen and pine forest) (Chan 1995, 12). The natural and planted forest areas cover totally about 56 percent of the land area in the North according to the RFD statistics (RFD 2003). The annual change of forest cover in northern Thailand has been -1.3% during the 1980s and 1990s (Mungkorndin & Castrén 2001, 3; cf. RFD 1997).

Figure 5. Map of Thailand showing the location of the study area (Hares et al. 2006).

Northern Thailand is characterised by north-south mountain ridges and narrow alluvial valleys that are all cultivated. The hills have steep slopes, and the soils are of medium or poor fertility (Turkelboom & Van Keer 1996, 1). Only 27% of the land is regarded as arable and is practically all under agricultural use (Chan 1995, 5). The Thai[15] majority occupies mainly the lowlands, whereas various ethnic minorities inhabit the upland areas of the North: the Mon-Khmer speaking group consisting of the Lawa, the H'tin and the Khamu; the Karen; the Meo-Yao and Tibeto-Burman groups of the Lahu, the Lisu, the Akha, the Hmong and the Yao; and the Haw, who are ethnic Chinese (Schmidt-Vogt 1999, 70–72). The ethnic groups have their distinct cultures and land use practices (Tan-Kim-Yong 1992, 8).

Four ethnic groups were included in the present study: the Karen, Hmong, Lawa and Northern Thai. The Karen form the largest upland minority group in northern Thailand; they compose nearly half of the total hill tribe population. In the area studied, the Karen are the most populous group, and the Thai, although the majority in the whole country, are the second

[15] The Thai is here referring to ethnic background.

largest ethnic group and the Hmong, the second largest group of the upland minorities, are the third in the study area. The Lawa are a small group even among the minorities but significant in number in the area studied. (ICRAF 2001a, 10). The Karen, Hmong and Lawa belong to the upland minority groups commonly called as hill tribes in Thailand.

4.3 Selection of the villages and interviewees

Samples in a qualitative study can change, and they can be combined, and, in addition, the process of sampling is often gradual. In fact, the question of sampling emerges at various stages of the research process (Flick 1999, 62–64). In this study, the procedure of sampling can be described as strategic, referring to information-oriented selection led by the research problem and objectives. In the context of case studies and small samples, this strategy helps to gather utilisable information. In this case, the selection of deviant or extreme cases was used in a sense that ethnic minorities and a relatively well forested area were studied, and also variant cases in selecting different villages. However, within the villages, the main method was to try to find critical cases that would have crucial importance in relation to the research problem. (Flyvbjerg 2001, 77–81).

The remaining forests are largely situated in the uplands, and on the other hand, a notable share of the inhabitants of those areas are ethnically other than Thai, although these so called hill tribes form only a small minority of the total population in Thailand. At the national level, the proportion of ethnic minorities is only one percent, while in the North Region they form six percent of the population, in Chiang Mai Province the percentage is twelve but in Mae Chaem the ethnic minority groups form a majority of the population, their proportion being 64% (ICRAF 2001a, 10).

The selection process of the villages[16] included visits to the villages of the study site and was done with the help of the staff of the CARE Thailand organisation[17] (referred here as the Care), an NGO which had worked in Mae Chaem for a long time already. The Care provided introduction to the area, background information and help with transportation at the beginning during familiarising with the area. One criterion in selecting the six fieldwork villages from the Districts of Mae Chaem and Chomthong was the ethnic group. Of the selected six villages, one was a Thai and one a Lawa village, two were Hmong villages (another one in Chomthong), one village was settled by the Karen and in one village the Karen with the Hmong formed the main ethnic groups.

Location of the villages was one aspect in selection for a closer study. All the villages were situated close to the forest but the characteristics of forest varied due to altitude, soil, and micro-climatic conditions. Although each village studied was accessible by car, three of them were more remote because the condition of the road was poor and probably impassable during the rainy season. Moreover, another aspect in selecting villages was the impact of the national park; one village was selected inside the national park and two of the villages were located within the gazetted Mae Tho National Park area (although the process was still incomplete with these two villages at the time of the study). The six villages selected were: Lawa village of Ban Ho, Karen village of Ban Yang San, Hmong villages of Mae Ya Noi and Ban Phui Nua (referred here only as Ban Phui[18]), Karen and Hmong village of Ban Pang Hin Fon, and Thai village of Ban Lau.

[16] Villages as administrational units were selected because one unit had a common forest management system.

[17] CARE Thailand is one of the twelve members of CARE International which is a non-political, non-religious humanitarian organization working in more than 70 countries with the main aim to alleviate poverty.

[18] It should be noted, though, that Ban Phui (Nua) is a separate village from Ban Phui Tai, although situated in vicinity. Ban Phui Tai was visited but not selected for more careful examination. It was a village with two hamlets: Ban Phui Karen and Ban Phui Hmong. Only some interviews were conducted in Ban Phui Tai and when referring to those interviews, the whole name of the village will be used.

At the individual level, the main strategy used in sampling of interviewees in the villages was to try to choose, on the one hand, approximately equal numbers of men and women, and, on the other hand, representatives of different age groups. The aim was also to cover different levels of education from illiterate people to those who had graduated from high school or had even higher education. The interviewees' sources of livelihood were included in the basic information. Furthermore, the religion of the interviewees was enquired. Animists, Christians and Buddhists (animism was often practiced side by side with Buddhism) were represented. A migratory status was also enquired in individual interviews. These pieces of background information were gathered because they were assumed to be the most relevant for environmental literacy within the scope of this study.

4.4 Methods used and material gathered

Interviews in the villages form the primary material for this study. Table 1 shows the total number of interviews conducted. The main methods of information gathering in the field were semi-structured interviews with open-ended questions. These were complemented by thematic group and unstructured interviews. All interviews in the villages were conducted with the help of an interpreter, in addition to which interviews of NGO staff and sub-district and district level officials were often carried out with the help of an interpreter. Observation was a supplementary method used in the villages.

Table 1. Summary of the interview material.

Village interviews				
	Men	Women	Village headmen	*Total*
Individual interviews	34	31	12	77
in study villages	31*	30	12	73
in other villages	3	1	0	4
	Men	Women	Mixed group	*Total*
Group interviews	5	13	5	23
in study villages	12	4	3	19
in other villages	1	1	2	4

* 30 semi-structured questionnaires

Other interviews	*Total*
Officials	15
Academics	9
NGOs	13
School students	30*

* 24 individual responses, 6 in groups

A set of questions of the semi-structured interviews was first tested in the field, then elaborated and modified, and a few readjustments were made during the research process. Despite this, the form and sequence of the questions remained more or less the same throughout the fieldwork although various interpreters probably affected the form of the questions. In the first fieldwork period, the Thai translations of the questions for the interviews in the villages were lacking, which made the possibility of changes in the form of questions more likely. Even with a Thai translation, problems occurred with some questions, and the translation was sometimes actually confusing when the questions needed to be translated into a third language, Hmong or Karen.

In the villages, these semi-structured interviews were used in interviews in households (Appendix). A slightly different set of questions was prepared for the village headman interviews to gain background information of the village. Usually, the procedure when arriving

at a new village was first to meet and interview the village headman, to explain to him the purpose of the study and ask for permission to conduct the research in the village. In transportation to the villages, the government and NGO cars were usually avoided to prevent linking the work to officials or NGO workers.

A mini-disc recorder was at the beginning used in part of the interviews when the interviewee gave his or her permission. However, it soon became evident that not all interviewees wanted their interviews to be recorded and that recording possibly interfered also with those interviewees who allowed recording. In recorded as well as in other interviews, all the responses were written down during the interview. One interview usually lasted about one hour, which appeared to be the maximum time one interviewee could allocate for that. Four interviews tended to be a maximum for one day.

In the semi-structured interviews, the number of background and demographic questions were minimised. Instead, the method of asking significant issues more than once in different words at different stages of the interview was utilised. It proved a good means to have answers from those interviewees who were shy or were for some reason unable to answer the question the first time. When an interviewee responded thoroughly already to the first question, the subsequent ones concerning the same issue were not necessarily asked to keep the total time within one hour and to be able to go through all the themes. Questions about the significance of forest, its uses, consequences of deforestation and its impact on local people, sufficiency and possible competition of forest resources, role of conservation, sustainable forest management and suggested actions for the future development of forest and tree resources were included in these interviews.

Thematic unstructured interviews were close to conversation, and the questions were not formulated prior to the interview but only the themes or topics of discussion were prepared beforehand. These kinds of interviews are based on certain themes which are brought to discussion in sequence applicable to situation, rather than formulated questions asked in certain order (Eskola & Suoranta 1999, 87). This method was mainly applied in the focus group interviews but also in some individual interviews. Moreover, the interviews of academics and people from government and non-governmental organisations were conducted as thematic ones, only with the topics tailored according to the organisation and interviewee in question so as to guide the conversation.

Group interviews conducted can be defined as focus group interviews. They are a form of group interviews in which the topic is more clearly defined than in group interviews generally. The participants were given a possibility to bring out the issues in relation to the topic that they regarded important. Group discussion stresses issues common to group members but individual features do not come up clearly (Alasuutari 1999, 152). Therefore, an attempt was made to form homogeneous groups, in terms of ethnicity and gender. Because of practical reasons, however, natural groups were often used, for example, in the rice field or the village shop, and, hence, in some cases, both men and women were present during the interview. These cases were mainly considered as men's groups because in mixed groups women commonly kept silent.

The principle of informed consent was put into practice by informing, as well as possible, the interviewees about the research, its objectives and purpose, and the researcher. In addition, although the interviewee's name was asked at the beginning of the interview, they were informed that it was only for the researcher's own purposes (to be able to interview the same person again) but not to be used in reporting. Anonymity of the interviewees was chosen although the topic, forests and their management, is not personal and, therefore, does not seem to require a high degree of anonymity. Nevertheless, it touches sensitive issues such as illegal logging and forest fires. The names of the villages, however, are used in this report, despite the fact that in a rural setting people could possibly be able to recognise each other from the report even without names.

Observation was a supplementary method. It was used in a rather unsystematic way, but the purpose of the descriptive observations written down in the field diary was to provide a general view of the situation. Observation had an aim also to cross-check the information when possible. This included observing of both the physical environment and the people and their actions. The advantage of having to use the interpreter was that it allowed observation of non-verbal communication during the interviews.

Other villages in the study site, in addition to the six selected ones, were also visited to construct a wider picture of the area. In six of these, unstructured thematic interviews were carried out. Four out of six were situated adjacent to the villages selected for closer study: Sedusá and Mae Hae Tai Karen villages were located in the same watershed and administratively in the same sub-district as Ban Ho; Ban Phui Tai, which consisted of a Karen and a Hmong village, was situated close to Ban Pang Hin Fon; and Ban Yang Luang, a Thai village, was situated in the Mae Chaem valley and was visited because it had suffered from severe flooding in the rainy season of 2002. Furthermore, two Karen villages further north in Mae Chaem District, Huay Bong and Huay Kiper, were visited. Some villages were, moreover, visited without an interpreter and just observations were made in them.

Participatory methods (meaning here other than interviews) were also experimented with gathering information from the field, mainly with an aim to complement the data from the interviews and obtain background information. Participatory tools can be good for mutual familiarisation of the researcher and the villagers, and, furthermore, they are one way of arousing discussion. Nevertheless, participatory methods provided no significant source of information for this study because of several practical problems in applying this approach in the field. Firstly, these exercises would require some time, and during the daytime people were working in their fields and occupied by other tasks, and when the village was not electrified, participatory exercises were practically impossible to carry out because of darkness. Moreover, the people present in the village during the daytime, the old people, young children and their mothers, were, however, the people who most probably were uneducated and very hesitant in participating in an exercise that they seemed to consider as academic or at least too difficult for them.

In the case of ethnic minorities, many of those illiterate people often could not speak Thai well enough, which was a problem because the interpreters with whom participatory exercises were attempted were Thai-speaking. Furthermore, application of participatory methods would also have required at least some experience from the interpreter. In addition, one aspect making participatory assessment challenging in that cultural environment was that usually only one person, even in a seemingly homogenous group, is “holding the stick” (to use the allegory of Robert Chambers, 1994) and thus dominating the exercise. What is more, in the villagers’ hierarchy the academic foreigner would likely to be the one who should hold the stick.

In addition to interviewing in the villages, material was also gathered from a public school, Rajpacha boarding school in Mae Chaem, which had students of various ethnic backgrounds from around the rural areas in the district. Pupils in grades *matayom* 3 and 5 (corresponding to comprehensive school grade 9 and high school grade 2 in the Finnish system)[19] were asked three questions to which they replied in writing both individually and in groups. The questions dealt with the significance of the forest, consequences of deforestation and forest products. Although the classes were visited during English lessons, the written answers were in Thai and translated into English afterwards. The school visit was realised without a translator, but the English teachers were acting as guides and interpreters. The problem was that their English skills were deficient, which limited communication and the questions to very simple ones.

[19] The school system in Thailand consists of two levels: lower called *pratom* and higher called *matayom*, both of which comprised of six grades.

Besides the material gathered by the means described above, documents were used as a source of data. In addition to scientific publications, also project documents, statistics from national, district and sub-district level, official documents, newspapers, newsletters and internet sources were used in building up an understanding of the research topic as thorough as possible. Furthermore, maps and photographs formed one source of information. To sum up, data and, to some extent, method triangulation were used in this work, meaning cross-checking of information by gathering data from various sources utilising more than one method, and contrasting and comparing these data (see e.g. Bell 2001, 102).

4.5 Evaluation of the methods and reliability of the material

Examining perceptions in foreign cultures is a challenging task, and structured questionnaires are often unsuitable for collecting this kind of material (see Forsyth 1996, 384). The advantage of semi-structured interviews is that the interview situation can be kept somewhat conversational, while the beforehand-prepared questions make data collection more systematic than in unstructured interviews (Mikkelsen 1995, 103). Interviews encourage two-way communication, they can provide detailed information, and they can be paced to fit the needs of the respondent. However, interviewing requires sensitivity and an ability to recognise and suppress the researcher's own biases. (Barton et al. 1997). Interviews as a research method are “particularly suited for studying people’s understanding of the meaning in their lived world, describing their experiences and self-understanding, and clarifying and elaborating their own perspective on their lived world” (Kvale 1996, 105). The method of unstructured interviews is useful in gaining participant perspectives (Maykut & Morehouse 1994, 82).

Focus groups can yield more information than an interview of one person. A group is a forum for reconstructing the individual opinions and also for problem solving by discussing the alternatives and seeking for the best strategies. (Flick 1999, 115). Focus groups are well suited to studies of attitudes and thinking, they enable the researcher to understand why people feel the way they do; a wide variety of views can be extracted. It is easier for informants to raise issues important to them in a group discussion than in a more structured individual interview. (Morgan 1988, 20–21; Bryman 2001, 338). A disadvantage is the difficulty of analysing a large amount of data in a relatively unorganised form. In addition, as compared to individual interviews, in group interviews the interviewer is likely to have less control over proceedings. It is an advantage, though, that the interaction between participants replaces, at least to some extent, the interaction with the interviewer. (Morgan 1988, 15–21, 52). When studying people in cultures in which communality is a central feature, focus groups are usually a more natural way of gathering data than individual interviews, which are anyway typically hardly individual with people around participating.

However, some difficulties occurred in using thematic group interviews. The method would provide more information if the researcher and informants had a common language. In this case, an interpreter was needed and, moreover, it was not always possible to have an interpreter of the minority languages. With an interpreter knowledgeable of the minority language the group interviews provided even more information than the individual interviews. On the other hand, within a group always some people could speak Thai and could help the other interviewees to express their ideas. Most minority people had some command of Thai, but sometimes their skill was limited to basic vocabulary.

Another difficulty in conducting group interviews was to ensure that all the group members had an opportunity to express their ideas. In particular, uneducated people, especially women, were often shy to express their opinions, and sometimes they were unwilling even to being interviewed. A reason expressed for unwillingness to be interviewed was that the villager felt that she (hardly ever he) knew nothing and that was why she wanted someone else to be asked. At this point, the researcher asked the interpreter to explain that the interview required no knowledge but every one’s views were equally important, and also to tell

why this research was conducted. The best way to include uneducated and shy people into this study proved to be an interpreter who was able to speak their mother tongue.

In addition, gathering a group of villagers together was also a problem and, as mentioned above, naturally occurring groups were often preferred because of practical reasons. The preference was to select gender-specific groups, such as women working with their handicrafts or men having their lunch break, in order to make the groups homogeneous in terms of gender and ethnicity although this was not always the case.

Responses that the interviewees assume the researcher expects may have had some effect on the material gathered. For example, when the interviewees knew that the research was about forests, they expected that responses should focus on forest even when more general questions, such as problems of the village, were asked. Another aspect was that many activities in the forest were technically illegal, which could have affected the responses. However, officials had visited the villages being aware of activities like swiddening but had tolerated them for the time being. This, together with those customary laws that the villagers still followed, made it unlikely that the fear of sanction would tried by also interviewing officials, academics and NGO workers in addition to the villagers (see Ganjanapan 2000, 18).

As mentioned, studying foreign cultures is always demanding, and in this case these were four distinct ones. The challenge was to understand the cultural differences and their effect on responses. For example, a feature of the Thai culture is to give polite answers to a guest, which may mean that the interviewees try to respond as they think they are expected to. In this dilemma the help of an interpreter was invaluable. On the other hand, the greatest constraints of the study were in one way or another related to the interpreters. One of these constraints was the conceivable bias of selecting educated interviewees when using Thai speaking interpreters in the minority group villages. However, this bias was unlikely to be considerable because such a number of people could speak Thai and interpreters speaking the minority language were also used. Nevertheless, the problems associated with conducting research with the help of an interpreter affected the fieldwork of this study, and, therefore, this issue is further elaborated in the following section.

Role of an interpreter

Using an interpreter in interviews adds one more step more to the interpretation of material: First of all, an interviewee presents his/her view, secondly an interpreter translates the answer, and thirdly a researcher interprets the answer. Therefore, a qualified interpreter would be essential for the researcher in order to minimise the transformation of information. One of the biggest constraints in this study was the difficulty in finding a qualified interpreter, or even any interpreter for that matter. It proved a demanding task to find a person fluent in English and willing and able to travel to remote villages for several days. Ideally, the interpreter could speak also one minority language, Karen, Hmong or Lawa, which made the selection even more challenging. After all, eight interpreters were used during the three fieldwork periods, and in addition to them, two interpreters worked only for one day because they could not fulfil the requirements. Most of the interpreters were students of or recently graduated from the Chiang Mai University. Four of the interpreters were Thai in their ethnic background; two were Hmong, and two Karen. No ethnic Lawa interpreter could be found but as most of the Lawa speak better Karen than Thai, a Karen interpreter proved to be adequate also with the Lawa.

Language is a central part of qualitative material. Therefore, information embedded in the richness of language will be lost if the researcher does not speak the same language as the interviewee (Alasuutari 1999, 113). A difficulty in having to use an interpreter is, furthermore, that the vocabulary and the way of expressing things may vary substantially in different languages. Martti Grönfors (1985, 177), for example, argues that the better researcher understands the informants' language and its usage the more accurate is the information gathered. This concerns not only interviews but also observations: the researcher should be

able to listen what is said and to fully utilise the information by observation. One of the problems of using ethnic Thai interpreters in minority group villages was that the interviewee had to speak another language than his/her mother tongue to communicate with an interpreter who, furthermore, translated the words to a language foreign to him/her. Inevitably, information is lost when using an interpreter. Even the risk of information bias increases. In this case, however, systematic bias should be a minor threat because it was minimised by the number of interpreters. Moreover, members of the minority groups were used as interpreters whenever possible.

The interpreters used were typically academic urban-dwellers and many of them ethnically Thai. Hence, they were felt as outsiders in the villages and sometimes they may even have been connected with the government as representatives of the Thai majority although no indication of this appeared. Only three of the interpreters came from the area studied. However, the Hmong and the Karen warmly welcomed a Hmong or Karen interpreter, and often some common friends or relatives could be found if the interpreter belonged to the same ethnic sub-group. Moreover, it seemed that the gender of the interpreter (3 women, 5 men) had some effect on the interview situation, particularly in group interviews: men often seemed to be more comfortable with men's groups and women when a women's group was interviewed. This may have had some, although probably a minor, effect on the depth of information received in some cases. Anyway, personal characteristics of the interpreter seemed to affect more than the gender.

The role of the interpreter included, as mentioned, more than just translation of interviews. In addition, they translated other conversations, gave cultural guidance, helped in communication with local officials and sometimes translated written material (such as village rules). They also assisted in practicalities, introduced the researcher to the villagers, and helped in selecting the interviewees according to the researcher's instructions. They, particularly those who belonged to the ethnic minority, also provided plenty of cultural information. What is more, people may sometimes feel more comfortable to speak to an interpreter than to a foreign researcher. In addition, sometimes it was difficult to judge what people actually thought about interviewing or recording the interview in a culture in which people dislike to say no, particularly to a guest. The interpreter helped in judging the situation in these cases. Although the interpreters lacked training in their task, they (apart from one who worked for one day only) had an academic background, which helped them to understand the requirements of academic research and the basic principles of interpretation.

Role of the researcher

When assessing the fieldwork results, it is also necessary to regard the role of the researcher. For the villagers, the researcher appeared as a foreigner (European), highly educated, and relatively wealthy compared to the villagers. It seemed that gender had much less impact, and being a woman researcher was probably only an advantage because women could talk more freely. Shy women, in particular, were easier to approach, and perhaps a woman researcher, being less authoritative, was more approachable also to some men. In a hierarchic society as the one in Thailand, the fact that the researcher is highly educated can affect the interviews because the interviewees in the villages tend to consider the researcher as superior in the hierarchy of society.

Although an attempt is made to minimise any association to government officials, it probably could not be totally avoided. Sometimes also a connection of the researcher with Care staff was at the beginning assumed in the villages. These associations with NGO workers or authorities were reduced by not using the vehicles of these organisations. Any misguided associations were reduced by openly telling the villagers the affiliation. Moreover, staying in the village was most often in people's homes. On the other hand, being an outsider is also an advantage in a way that the researcher can thereby avoid being connected with local tensions caused by, for instance, rivalry over land and other resources. An outsider has a better

possibility to gain a general view of a multicultural area like the one studied, despite difficulties in dealing with distinct languages and cultures.

Some expectations of the villagers regarding the researcher and the research results appeared. They sometimes seemed to hope that their situation would somehow improve as a result of this research, and although their expectations were not encouraged in any way, they may have felt disappointed when the research had no direct effect on their lives. An ethical code to attempt to minimise disturbance to the people studied and to their relationships with the environment was followed.

A researcher is often faced with ethical questions during fieldwork. In this case, these included illegal activities such as illegal logging or forest burning and the use of drugs in the villages. Illegal logging and burning were evidenced only indirectly, but drug abuse could be observed while in the villages. Some opium poppy was still grown in the area and therefore it was advisable to walk around in the hills only with the villagers, or to use the paths they recommended because the law is very strict against drugs.

Critical view of the material

Several aspects affect the reliability of the material in this type of study. Interviewees' responses may be shaped by the expectations they think the researcher has, and shyness, politeness or even fear of eviction from the protected forest areas, or, in the case of officials, policy guidelines, may shape the answers. The difficulty is in understanding what lies behind people's opinions. Various projects of government agencies and NGOs may attempt to influence villagers' views and attitudes, for example, towards national park establishment. Illegal activities may remain hidden although in the villages studied an agreement on rights to use community forests existed. Misinformation can be given on purpose but also unintentionally, for instance, regarding to time scales. On the other hand, the interviewees may take common activities, such as collecting firewood, as granted and therefore these may be omitted from their responses.

Apart from possible misunderstandings because of language, cultural differences may affect translation and the researcher's interpretation, particularly in this kind of study that includes interviews of people from different cultures, sometimes different from the interpreter's culture and, especially, different from the researcher's own cultural background. All in all, it must be kept in mind that responses are shaped by the context. Because of all these factors, a qualitative material tends to be of uneven quality, which needs to be taken into account. Moreover, the analysis of such material is challenging because no standardised analysis techniques exist.

4.6 Analysis of the fieldwork material

In this type of study data collection and analysis are carried out side by side continuously referring back to each other. Although analysing continued throughout the research process to some extent, it is necessary to describe the systematic analysing process of the fieldwork material. Categorisation was a central feature, as in content analysis, but the categories were derived both from empirical material and from theoretical background, although the research questions posed were guiding the analysis (Strauss & Corbin 1990, 111; Flick 1999, 193). Some topically specific narrative elements were included to complement the analysis. A relatively large number of interviewees, whose anonymity was secured to the appropriate extent, was, however, the reason to concentrate on a coding type of analysis (see Riessman 2002, 706).

As the first step, the material was arranged by making a documentation sheet of every interview. The analysis of the individual interviews conducted in the villages started with organising the data and giving codes to the interviewees. Each village interview was given a

code. The codes of individual interviews included information on interviewee's sex, age, education, ethnic group and the village of residence.

Secondly, the data from individual semi-structured interviews were arranged by subject matter according to the questions asked. After this, the data were summarised by aid of quantification; the categories including the codes of individual interviews were summarised in tables. During this process, however, new themes emerged from the material. Thus, to develop the analysis further, the key themes were redefined combining the ones defined at the beginning with the new ones. These themes were derived from the research questions, and they formed a framework for analysis. The key themes were used to reorganise the data. A result from this thematization was a set of thematically arranged citations which formed the basis for further analysis. The themes were coded (coding referring to analysis method), and this was used as the basis for categorising. Further coding and categorisation were made when necessary.

Coding of qualitative material refers to conceptual categorisation which is based on research questions and which is an integral part of analysis. It was carried out to make the amount of data manageable. The three steps of coding typically presented as a model to analyse qualitative material were applied to the appropriate extent. Some coding was done already between the first and second field trip and the whole process before the third, complementary visit to the field. Open coding was the first step to locate themes as described above. During the second step of axial coding interactions, patterns, processes, causes and consequences were tracked. This evoked new questions and, thus, new themes were created and the initial ones modified. This process affected the data collection in the second and third fieldwork period. A third phase of coding when the themes are already identified and examined thoroughly to illustrate patterns and make comparisons is called selective coding. During this stage, the themes were analysed further in order to elaborate the major themes and to shed light on the research questions. (Neuman 1997, 421–4)

In the third phase, the analysis focussed on identifying occurrence and differences and interpretation of structures and relations (see Kvale 1996, 197–204). This included systematic searching for and synthesising of patterns, similarities and variations, and deviant cases. An overview of the occurrence and an analysis of differences were done within various categories on the variables including residence, ethnic group, sex, age, education, occupation, and income level. In further analysis, possible interlinkages were identified. Key questions asked during the analysing process included: Why? What has lead to the situation and how? Interaction among actors was examined by the questions 'who acted' and 'what happened', and strategies and consequences were looked for. Negative evidence was considered by asking why some things were expressed while others remained unexpressed.

Group interviews were included in the analysing process described above when doing the meaning categorisation of the data according to the themes, but they were analysed as a somewhat separate set of data by using codes. They were detached from the individual interviews when analysing environmental literacy, which was defined basically as an individual characteristic. In the search for similarities, however, the overarching patterns in the communities were looked for. Other interviews, those of officials, NGO workers and academics, as well as the data collected at Rajpacha School, were analysed using a basically similar method, omitting quantification but analysing the contents through thematization and categorisation. The same themes and key words that were used in the village interviews formed the basis of this analysis.

In subsequent analysis of the material, quantification in the form of charts, tables and sometimes percentages was used. Charts were presented to compile summaries and to illustrate the analysis, not to reduce it to numerical data (Neuman 1997, 437). Numbers and tabulation were used as corrective and indicative means, recognising that they were only devices for telling the story (Dey 1993, 223). Numerical data help to support claims and enable to "assess the amount of evidence" in qualitative study (Maxwell 1996, 95). Percentages, for instance, were used to demonstrate the frequency of responses, to give an

idea of the significance level, and to show that the material was used systematically. The aim was not to present an average case even if common features were looked for. (Alasuutari 1999, 42, 192–212). Systematic statistical analysis was omitted because of the heterogeneity of the interviewees and the nature of interviews with flexibility in question formulation and sequence and differences between group and household interviews. The results are discussed in the next chapters: Chapter 5 presents the fieldwork results and the literature study. Chapter 6 describes the results of fieldwork. The discussion in Chapter 7 brings the results into a more theoretical level. This follows basically the structure traditionally used in forestry research.

4.7 Fieldwork site in Chiang Mai Province

The six villages studied were located in Chiang Mai Province some 100–150 km south-west of the city of Chiang Mai. Five of these villages – Ban Lau, Ban Yang San, Ban Ho, Ban Phui, and Ban Pang Hin Fon – were situated in Mae Chaem District in the Mae Chaem River watershed. One of the villages, Mae Ya Noi, was located within the Doi Inthanon National Park and belonged administratively to Chomthong, a neighbouring district of Mae Chaem in the east (Fig. 6).

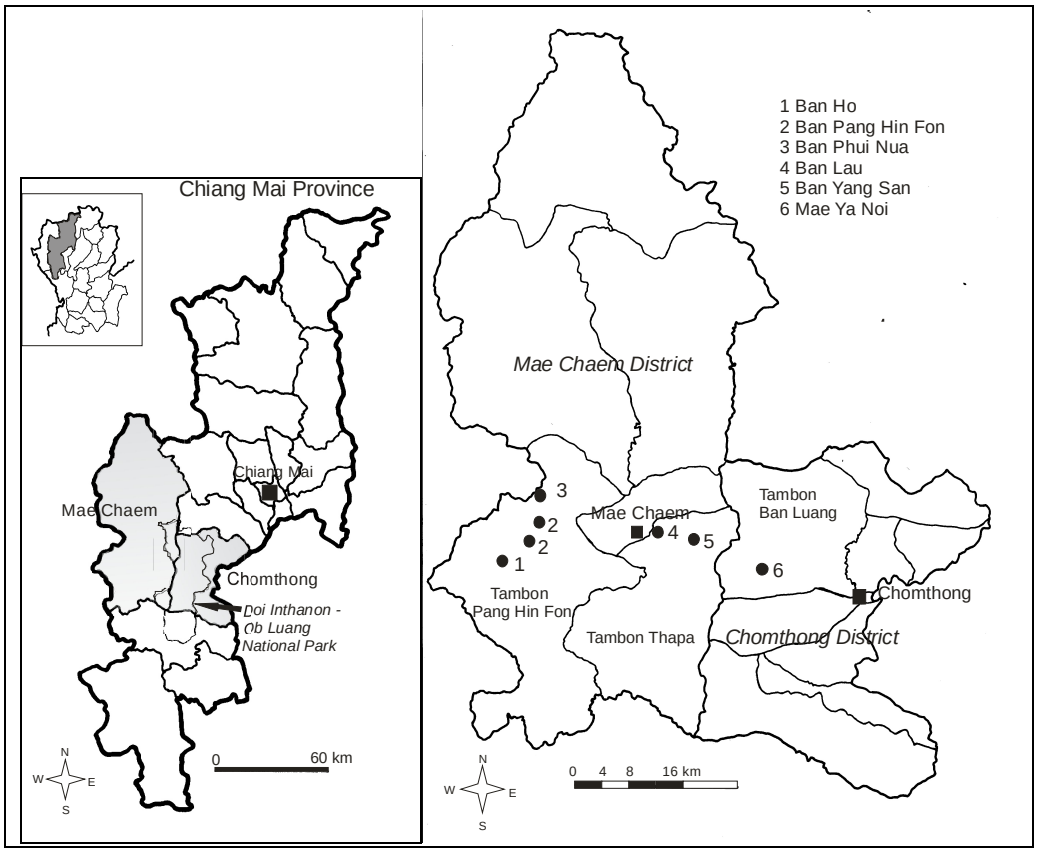

Figure 6. Map showing the location of the villages studied in Mae Chaem and Chomthong Districts.

Brief review of history

During the twentieth century, the influence of Central Thailand on the northern region increased only gradually; for a long time, until the 1970s, the railway was the primary connection between Bangkok and Chiang Mai. From the 1980s onwards, increased tourism, investment, and governmental projects have significantly diminished the isolation of Chiang Mai from the central region. This trend has induced changes in the local northern culture and the old ways have begun to lose their meaning although the belief in spirits still prevails. The northern form of Buddhism has also assimilated into the Buddhism practised elsewhere in Thailand. (Renard 1996, 176–8)

According to legends, some of which are recorded in the Chiang Mai chronicles of the 14th century, the Lawa were the first inhabitants of the Chiang Mai valley. After them arrived the Thai, and it is estimated that they have inhabited Mae Chaem from the 13th century. The Karen entered Chiang Mai and also Mae Chaem in significant numbers during the war between the Thai and the Burmese around the very beginning of the 19th century. (Renard, 1981). One of the first two places where the Karen migrated when they arrived in the Ping River valley was probably Mae Chaem, which the Lawa already inhabited at that time (Renard 2001a, 66–67). In Mae Chaem, the Karen started to gradually displace and, sometimes, to absorb the Lawa. In addition, the Lawa were also mixed with northern Thais. The Hmong are quite recent immigrants in this area: they started to enter the region in larger numbers only during and after the Second World War. (Renard 1981).

Mae Chaem has had only a limited area of arable land and, thus, until recently its population has remained relatively low. Throughout its history it has been regarded as a backwater, and only in 1980 the road to Mae Chaem valley was paved. This remoteness, however, did not save the district from teak loggers: British companies entered the area probably already at the end of the 19th century. (Renard 1981). Remoteness, on the other hand, made it possible for opium poppy (*Papaver somniferum*) production to continue until the turn of the 1970s and 1980s. During the communist insurgency Mae Chaem was considered as a "red area" and a threat to national security (Uparasit & Isager 2001, 14). Security problems reported during the period 1974–80 included armed opposition of "some groups" against the government and incitement of villagers (Ministry of Agriculture and Cooperatives 1988).

Security problems and opium poppy cultivation drove the government to launch a specific Mae Chaem Watershed Development Project in 1981 with the help of the USAID (US Agency for International Development). In addition, poverty, lack of education and health care, inadequate water resources, and slash-and-burn cultivation were regarded as problems in the area. To solve the problems identified, several activities were carried out: terraced fields and agricultural experimental plots were established, irrigation canals constructed, cash crops promoted, fire prevention improved, an area of 1,820 *rai* reforested, 175 km of roads constructed and repaired, and actions to reduce soil erosion taken. More than four thousand land use certificates were issued covering almost 9,500 *rai*, and, in addition, the Mae Chaem Agricultural Cooperative was supported. The project also included rehabilitation of opium addicts. At first, the whole district and some areas of Hot District, south of Mae Chaem, were included in the project, but later the northernmost part of Mae Chaem and the areas in Hot were excluded. The project continued for seven years until 1987. (Ministry of Agriculture and Cooperatives 1988)

Population: ethnic minorities as the majority

The population of Mae Chaem is reported to total 64,866 (Mae Chaem District Office 2001) and it comprises the ethnic groups of Northern Thai, Karen, Lawa, Hmong and Lisu (Table 2). The Karen are the most numerous ethnic group in Mae Chaem and they belong to the sub-group of White (Skaw) Karen. The Karen and Lawa had resided in the area already for generations. It has been stated that they inhabited the area before the Northern Thai arrived. The first Hmong moved to the area about a hundred years ago (Jongruk 2002, pers. comm.).

The Lisu were the most recent newcomers. Most minority people born in Mae Chaem had a Thai citizenship. Some of those who lacked citizenship had decided to omit registration.

Table 2. Population of Mae Chaem by ethnic group (Sources: Mae Chaem District Office 2004, pers. comm.; ICRAF 2001b).

Ethnic group	*Number of people*[1]	*Number of villages*[2]	*% of population*[1]
Karen	31,243	183	48%
Northern Thai	19,123	53	29%
Hmong	8,926	15	14%
Lawa	2,300	6	4%
Lisu	2,264	1	3%

1) Mae Chaem District Office 2004
2) ICRAF 2001b

Four of the six villages studied were situated approximately at the elevation of 1,000 m above sea level (asl.). One village was in the lowland, below 600 m asl. Most of the study area is comprised of highlands (above 1,000 m asl.) and uplands (600–1,000 m asl.) (according to the ICRAF (2001a) definition). These areas are in this study referred to only as uplands. The Mae Chaem River flows through Tambon Thapa, which has almost one third of its area in the lowland. Other tambons are characterised by the upland. Tambon Ban Luang, with twenty-two villages, was the most populous of those studied. (Table 3).

Table 3. Population and land area of the tambons (sub-districts) where the case villages were situated (Chomthong District Office 2002; Mae Chaem District Office 2004, pers. comm.; land area information modified from ICRAF 2001a).

Category	*Tambon Thapa*	*Tambon Pang Hin Fon*	*Tambon Ban Luang*
Population (total)	4,951	6,809	16,162
Men	2,515	3,417	8,039
Women	2,436	3,392	8,123
Land area (ha)	10,672	24,167	(not available)
Highlands (>1000 m asl.)	25%	75%	
Uplands (600–1000 m asl.)	45%	25%	
Lowlands (<600 m asl.)	30%	-	

The population growth in the villages studied mainly consisted of natural growth. The migration pattern was typically outwards from the village. None of the villages had experienced any significant migration from the lowlands. Some seasonal workers travelled to the villages even as far as from Myanmar when extra labour was needed in the fields, whereas the migration from the surrounding area was mainly due to marriages. Reasons for out-migration, apart from marriage, were basically migration for work and for education, in these latter cases often temporarily (see also Aparasit 2001, 7–8).

The majority of the population in Thailand are Buddhists, but in Mae Chaem their share was less than half of the population (42%). Animists were the second largest religious group (34%), and one fourth (24%) of the population were Christians (Uparasit & Isager 2001). The borderline between religions, chiefly between Buddhism and animism, is, however, vague: people may identify themselves as Buddhists but practice animist rituals and ceremonies. Some of the interviewees identified themselves both as Buddhists and animists.

Livelihood

Agriculture was the main source of livelihood for the great majority of the population. Most of the farmers grew cash crops, and many villagers worked as casual labour in agriculture. In addition, some villagers worked as wage labourers in towns and some in government organisations, such as the Watershed Management Unit of Pang Hin Fon (see also Aparasit 2001, 16). Many of the farmers also had a secondary employment as wage labourer during the non-farming season.

All tambons in Mae Chaem District were classified into the fifth, the lowest, class of financial capacity according to their annual budget (Care 1999). The income level of the people studied was also low. For example, the average income of a household included in the study in Mae Ya Noi village was about 27,000 Baht per year[20], while the district average was 67,612 Baht of annual income per household. The poverty line was defined as less than 15,000 Baht of annual income. (Chomthong District Office 2002, pers. comm.).

Within Tambon Ban Luang, in which Mae Ya Noi belongs, a low income was identified as one of the main problems in the area (Development Plan for Ban Luang 2002). There the average annual income was only 12,191 Baht per household, and the percentage of poor households was 64% of the total number of households in the tambon (Chomthong District Office 2001). The regional average for annual income in the poorest households was calculated by Aparasit (2001) as 40,850 Baht, while the national respective figure was 51,110 Baht. When compared to the figures gathered from the interviewees, it seems that the majority (70%) of those households (except in Ban Phui) belonged to poorest in the northern region and the poorest in the whole country.[21]

Infrastructure

The infrastructure of the Mae Chaem and Doi Inthanon region has improved notably during the past two or three decades. In the late 1970s, roads to connect Mae Chaem with Chiang Mai were constructed, one through Hot and another one through Chomthong. Road connections have improved since the 1980s, and now many of them are paved. Hence, most areas are now accessible by pick-up truck or motorcycle although during the rainy season some roads may be impassable. Moreover, telecommunications have improved, and apart from radios, televisions can be found in many villages. (Uparasit & Isager 2001, 9–10). This could be observed also in the villages studied, all of which had a road passable by a pick-up truck.

The electrical grid was, however, less developed than the road connections. The explanation was the large area of protected forest, which by definition should be uninhabited. Approximately two thirds of the villages were without electricity (Mae Chaem District Office 2001). Of the study villages, only the Thai village Ban Lau was electrified. The Ministry of Science, Technology and Environment had provided solar cells to the non-electrified villages. The energy that the solar cell panels captured could be stored in rechargeable batteries, but that energy was enough only for limited community purposes. This system was, furthermore, difficult for some villages in which the settlement was scattered in separate hamlets, such as in Ban Yang San (Aparasit 2001, 11).

A school for the lowest grades could be found in all the upland villages studied, except for Ban Yang San, which had only a childcare centre and a school building but no teacher. Therefore, the children there had to go to school to the neighbouring village. In the lowland village Ban Lau no school existed either, and the children went to school in Mae Chaem town,

[20] Ukrit Aparasit (2001, 17–18) ended up with approximately the same figure when calculating the annual average income of the households of Ban Yang San. 1 Baht equals about 0,022 Euros (March 2006).
[21] It must be noted, though, that the income information from the interviews may be inaccurate because interviewees may not report all their sources of income. Calculations for a whole village can be merely suggestive rough estimates because of the small sample.

which was four or five kilometres away. Although Mae Ya Noi had a school, many parents were dissatisfied with the level of education at the local school and sent their children to town for school.

Physical environment

The temperature in the study area fluctuates from approximately 40˚C at the highest to 8˚C at the lowest and may be even lower at high elevations; in the mountains the temperature may fall to the freezing point during the coolest months (December-January). The mean annual temperature in Chiang Mai in the period 1993–2003 was 25.5˚C. The precipitation fluctuates quite considerably: for instance, in 2002, the rainfall in Chiang Mai was 1,612 mm but in 2003 only 890 mm. Chiang Mai's mean precipitation in 1993–2003 was 1,143 mm per year. (RFD 1997; 2001; 2003). The rainy season is from May to October but, again, years can be somewhat different. Altogether four seasons can be distinguished: After the rainy season, a post-monsoon season prevails from October to November and it is the intermediate season in between the rainy and dry seasons. November to February is the coolest season with low precipitation. The hottest and driest season is from March to May, with May often being the hottest month just before the rains. (Anderson 1993, 38). During the dry season from October/November to April only 15% of the annual rainfall is received (Schmidt-Vogt 1999, 36), and forest fires become common, especially towards the end of this period.

In the study area, mountain ranges stretch as north-south folds; granite, limestone and some quartzite appear (Anderson 1993, 37). Geologically, the Mae Chaem watershed is comprised of the new sediment valley (190–500 m asl., slopes 0–4%), the old sediment hills (500–650 m asl., slopes 4–16% and up to 35%), and the highland of 700–2,000 m asl. (with slopes >35%) (Wangpakapattanawong 2002). The highest point of Thailand Doi Inthanon, which rises up to 2,565 m, is situated close to the border of Chomthong and Mae Chaem.

Soils on the steep mountain slopes are predominantly red-yellow podzols. They are fairly acidic and poor in fertility. At lower elevations, reddish-brown latosol soils can be found. They are less acidic but not very fertile either. However, they are stable and good in water retention, which makes them suitable for slash-and-burn cultivation. Fertile alluvial soils can be found in valleys. (Anderson 1993, 37–38)

Soil moisture is the central determinant of the forest type: basically, evergreen broadleaved forests require abundant soil moisture, whereas deciduous forests occur where the soil loses its moisture during the dry season. The main impact of human disturbance on vegetation is through soil moisture resulting in drying out the soil, erosion, depletion of nutrients, and reduced plant growth. Wildland fires have a particularly degrading impact. (Maxwell & Elliott 2001, 1)

Different classifications of the vegetation types of northern Thailand have been made, and deforestation and degradation of the forests has contributed to confusion in these classifications. The forests in the study area are seasonal (monsoonal). Deciduous forest with bamboo can be found up to 850 m. Its secondary or degraded growth encompasses deciduous dipterocarp-oak forests (often called as dry dipterocarp forests), bamboo thickets, and grasslands. The evergreen forests of the North consist of three types. The first type of evergreen forest (1,000– 2,565 m asl.) has bamboos and deciduous dipterocarp-oak as secondary or degraded growth and bamboo thickets and grasslands as tertiary growth. The second type consisted of mixed evergreen and deciduous forest. It has already been destroyed quite extensively and although it may occur at as low elevation as
450 m, it can now chiefly be found from 850 m to 1,000 m and often as severely degraded. Many of the mixed forests have been transformed to deciduous dipterocarp-oak forests. The third evergreen type of forest occurs with pine and has deciduous dipterocarp-oak forest as secondary or degraded growth. Pines (*Pinus kesiya* and *P. merkusii*) grow mainly above

1,000 m and are common up to circa 1,550 m and rare up to 1,850 m. (Maxwell & Elliott 2001, 8–16)[22]

Protected areas

Mae Chaem is an important watershed area covering almost 4,000 km^2. It contributes 40% of the flow in the upper Ping River, which flows through Chomthong District, and 16% of the Chao Phraya River flow, which ends up to the Gulf of Thailand through Bangkok. The Mae Chaem watershed consists of four sub-watersheds, Mae Malo, Mae Rak, Mae Paan and Huay Ban Yang, and these are further divided into fourteen minor watersheds. Ninety percent of the area is upland, and most of this area (64% of total land area) was classified as protected watershed under Classes 1A and 1B. In addition, one fourth of the land was classified as watershed Class 2 (Table 4). The forests in the Mae Chaem watershed were declared a forest reserve in 1974 (Aparasit 2001, 26).

In total, the protected forest area was larger than the estimated forest cover, which was 82%[23] in 2001. However, despite large protected areas it has been calculated that during the 1990s till the turn of the 2000s the forest loss was 8%. Deforestation seemed to be a problem notably in the midlands (600–1,000m) due to a particularly high pressure on land resources. The estimated share of agricultural land was only two percent, which indicates that the greatest forest loss has not occurred because of expansion of agricultural land. (ICRAF 2001a). The size of fields per household had actually diminished with the abandonment of swidden cultivation. The largest area of arable lowlands existed along the Mae Chaem River adjacent to district capital.

Table 4. Watershed classification and land use in northern Thailand and Mae Chaem (ICRAF 2001b).

	North Region of Thailand	*Mae Chaem*
Watershed classification	% of total land area	% of total land area
Watershed Class 1	33%	64%
Watershed Class 2	15%	25%
Watershed Class 3	11%	9%
Watershed Class 4	10%	2%
Watershed Class 5	32%	1%
Land use		
Forest cover (estimate)	44%	82%
Agricultural land	28%	2%
Other non-forest land	28%	16%

At the time of the study, only one fully established national park stretched to the territory of Mae Chaem: the Doi Inthanon-Ob Luang National Park, which covered a large share of Chomthong District and was extended to Mae Chaem when enlarged to its present size (Aparasit 2001, 26). New parks were, however, under planning. The Mae Tho National Park in southern Mae Chaem was in the process of establishment and demarcation of boundaries. In addition, another national park was suggested to be established in the north-eastern part of the district (ICRAF 2001a). The Mae Tho National Park extended to Tambon Pang Hin Fon,

[22] This classification of J. F. Maxwell and Stephen Elliot (2001) somewhat differs from most vegetation classifications presented in Thailand. It is, however, presented in this context because it is based on recent research particularly in the northern highlands (Doi Chiang Dao and Doi Sutep-Pui) and it also recognises secondary and degraded growth.

[23] The estimate of the District Office was 70% forest cover (Mae Chaem District Office 2001). The difference between the figures is most probably caused by differing definitions of forest, especially on whether shifting cultivation fallow areas are included.

including areas of Ban Ho and Ban Pang Hin Fon. These two villages were among the last ones in the tambon to continue negotiations with national park officials at the time of the study. The villages within the planned Mae Tho National Park area, Ban Ho among others, had already lost some farming land to the park. Similarly, when the Mae Chaem Forest Reserve was gazetted, villages, Ban Yang San among others, lost some arable land (Aparasit 2001, 27).

The main environmental problems in Mae Chaem, as listed by Dupar and Badenoch (2002, 30), were an increasing use of agricultural chemicals, soil erosion, watershed degradation, water shortages and a decrease of biodiversity. In addition, the Care (1999) also included over-utilisation and degradation of forests into the list of problems. Promotion of reforestation is in the district administration considered as one crucial activity to counteract environmental problems: to maintain the soil fertility, to protect the watershed and to maintain the scenery (Mae Chaem District Office 2001).

In Tambon Ban Luang, the problems regarding natural resources that had been reported in the tambon development plan (2002) for 2003 included water shortage for domestic and agricultural use, logging, forest fires, illegal occupation of land, garbage and air pollution because of it, and the use of pesticides in fruit and vegetable cultivation. In addition, the shortage of land for household needs was identified as a problem in the tambon. To address these problems, intensified fire control activities were planned to be implemented in each village and, along with that, also reforestation. The main efforts were, however, directed to solving water resource problems. (Development Plan for Ban Luang 2002)

Apart from the forests, other natural resources are also found in Mae Chaem: lignite, tin, fluorite and manganese (Mae Chaem District Office 2001). Further exploitation of these mineral resources may pose a threat to the forests and the environment as a whole. In addition, it would also add to the pressure on land resources as it would probably diminish the area of arable land.

Land use

The land in the area could be grouped into three types according to topography and soil:

1) Flat lowland areas in river valleys and floodplains, where paddy rice can be cultivated;
2) Uplands suitable for upland crops and where slash-and-burn cultivation used to be the principal farming system;
3) Uplands with steep slopes unsuitable for cultivation (Chan 1995, 5).

Only less than ten percent of the total land area was classified as suitable for agriculture. Nevertheless, even steep slopes were often cultivated. Merely slightly over one percent of the land area was suitable for irrigated farming, and the land suitable for hill crops only covered about seven percent of the area (Ministry of Agriculture and Cooperatives 1988).

In the past, rotational slash-and-burn cultivation was the main form of land use, and the main crop was upland rice, intercropped with various other crops; paddy rice was cultivated only on a small area. Aerial photographs show that in the 1950s no modern roads or national parks existed, the landscape was dominated by forests under different stages of succession during the fallow period, and only relatively small areas were cleared for cultivation annually. (Thomas 2003). Since then significant changes in the landscape have taken place. The forest area was chiefly permanent instead of being a fallow in a swidden cycle. On the other hand, the area under cultivation has increased substantially during the past decades, mainly because cash crops are grown in addition to subsistence crops. (Thomas 2003). While the slash-and-burn cultivation area has considerably diminished, intensive cash crop cultivation has been increasing in area. It is often practised at sites of former opium poppy fields and typically in villages with good road communications. Irrigated fields are found on flat lands, but now, in addition to rice, cash crops are grown in them. (Care 2001). Agricultural changes will be discussed in more detail in the following chapter.

Outside actors in natural resource management

The main objective of the projects in Mae Chaem in the 1970s and 1980s was the eradication of the opium poppy (Care 2002). Mae Chaem District was one of the main production areas of opium poppy in Thailand. Already in the 1970s a project to eradicate the opium poppy was started in the Mae Chaem watershed. Foreign funding, however, ended in 1979, and as job opportunities and the income decreased, deforestation took place. (Kaosa-ard 2000, 14). Already at the beginning of the 1980s, a new project started. The Mae Chaem Watershed Development Project, as mentioned, was implemented during seven years in seven watershed areas. The project aimed by developing the farming practices at creating alternative opportunities for opium poppy growing (Tapp 1990, 158–9; Renard 2001b, 92). Furthermore, the RFD has carried out projects to reforest the former opium poppy fields. As a result of the projects implemented in the area, the opium poppy was fairly successfully replaced with other crops although the substituting crops were more demanding. Abandoned lands were, however, sometimes unable to recover, and the Imperata grass (*Imperata cylindrica*) colonised large tracts of the area. (Care 2002).

The Care International in Thailand (supported by Danced, i.e. the Danish Cooperation for Environment and Development) has been actively involved in natural resource management in this area since the mid-1980s with its projects, the Integrated Natural Resources Conservation Project (see Care 2000) and the Collaborative Natural Resource Management Project (CNRM). The Care projects have also included organisational strengthening and education. At first, the Care concentrated on promotion of cash crops. In the second phase, an agroforestry component together with soil and water conservation and health and sanitation was added. (Care 2002). The emphasis in the recent project has shifted to integrated natural resource conservation following the general trend of forest policy development. In addition, institutional development was considered as central in the Care agenda.

The Royal Project started in the area in the 1980s. It still operates in the mountainous areas of Mae Chaem and Chomthong. Its main activities today include research, extension, reforestation and community development (Highland Symposium 2004). In addition, H. M. Queen Sirikit started a project in 1982 known as *Suan Pah Sirikit* which aimed at conservation and socio-economic development. The RFD has had the main responsibility for its implementation. The leading idea of the project is to promote harmonic co-existence of people and forests, and the starting point is that the forests secure the water supply. One aim is to increase the knowledge and understanding of "forests as headwater sources". Activities include, for example, tree planting, and forming of forest conservation groups and weaving groups. The project started from two villages in Mae Chaem, but it has expanded to more than hundred villages. (H. M. The Queen's Initiatives, undated). Within this programme, for example, a handicraft project to increase women's income was ongoing in Ban Yang San.

Attempts have been made to stop slash-and-burn cultivation within the agricultural projects in the area. The World Agroforestry Centre (ICRAF) has started its Alternatives to Slash-and-Burn (ASB) Programme under an agreement with the Thai government. It works in close cooperation with the Care Thailand and with the RFD as a counterpart agency. The programme is essentially focussing on research that supports other projects. (ICRAF 2001a).

The government's Social Development Project, which the government savings bank Thanakarn Aumsin administers, had many sub-projects, and one of these was the Forest Conservation and Headwater Development scheme. It provided money to the communities for nature conservation and, for example, Ban Yang San was involved in this scheme. (Aparasit 2001, 28)

In addition to the actors from outside, local people's organisations also exist. In Mae Chaem, they include Farmers' Group, Farmers' Housewife Group, Agriculture Protection Group, Nature Lovers, and Sub-District Farmers' Group. These organisations have typically a few

hundred members, except for the Farmers' Housewife Group that has almost four thousand members. (Mae Chaem District Office 2001). In addition, Watershed Management Networks have started to operate as a result of the Care initiative.

Villages studied

Ban Lau (Tambon Thapa, Mae Chaem District)

Ban Lau is a Northern Thai village situated between Mae Chaem town and the Doi Inthanon National Park in a valley of Mae Rak River, at about 550 m asl. According to the village headman, the village has been settled for more than one hundred years. It consisted of 85 households, and the main source of income, as in upland villages in general, was agriculture. This village, however, differed from the others because most of the villagers had paddy fields; in other villages only a few individuals could cultivate paddies. Paddy rice, shallot, maize and soybean were the main crops. In addition, cows, pigs and chickens were raised.

The forest type adjacent to the village was basically deciduous forest although largely degraded. The village had a conservation forest of 50 *rai*, which was considerably smaller than those of the upland villages studied. The conserved area used to be a cotton field, but as cotton cultivation had been abandoned, part of the former field was left to become forest, and the trees were already large.

The village had a location near to the main road from Mae Chaem to Chomthong and within a short distance from the Mae Chaem District centre. This was the only village studied that was electrified. The average annual income among the households interviewed (n=10) was 35,200 Baht. The average household size, in contrast, was smaller than among the upland minority groups, and therefore the income per person was the highest of the villages studied, that was slightly less than 9,000 Baht per year. The projects carried out in the village included the Care project and the Queen Sirikit Project, the main aim of which was environmental conservation.

Ban Yang San (Tambon Thapa, Mae Chaem District)

Ban Yang San was a Karen village that had been settled, according to the villagers, for more than one or even two hundred years. It comprised three clusters of settlement: Upper and Lower Yang San, and Ban Mae Kong Ngon. It lay in the Mae Rak sub-watershed similarly to Ban Lau. The Karen in Ban Yang San belonged to the subgroup of Skaw or White Karen. Their religion was Buddhism, or "close to Buddhism", as the village headman defined because also animist traditions were practised. Village's Buddhist temple, *wat*, had been constructed in 1995 (Aparasit 2001). The population of the village was altogether 345 inhabitants divided into 48 households (in 2002).

Rotational slash-and-burn cultivation with a six-year rotation cycle and upland rice as the main crop used to be the chief farming system in the village until 1992 when the villagers decided to abandon it. In the background of this decision was the government's initiative on policy to halt swiddening. Another method applied has been crop rotation of upland rice and legumes, typically mung bean or soybean. (H. M. The Queen's Initiatives, undated). The most important crops were rice and maize, and pigs and chickens were raised. Fruit trees had recently gained ground in the fields and included mango, lychee, jackfruit and longan. Growing of fruit trees was promoted by the Care Project. In addition, the Queen Sirikit Project was active in the village aiming at providing income generation opportunities, for instance, from weaving.

Ban Yang San was situated in a watershed classified as A1, at about 800 m asl. The land use in Ban Yang San was divided into approximately 4,500 *rai* of conservation forest, roughly 3,000 *rai* of utilisable forest including degraded areas with bamboo thickets, and about 2,000 *rai* of agricultural land (H. M. The Queen's Initiatives, undated) (Table 5). A road from the village to Mae Chaem had been constructed in 1982 by the Mae Chaem Watershed

Development Project (Uparasit & Isager 2001, 28). It crosses the Mae Rak River and may be impassable during the rainy season.

Table 5. Land use in Ban Yang San (Uparasit & Isager 2001, 28).

Type of land use	*Area in* rai	*% of land-area*
Forest for use	7,000	55%
Conservation forest*	4,540	36%
Upland fields	900	7%
Paddy fields**	115	1%
Orchards	25	<1%
Settlement	20	<1%
Total	12,600	100%

* Traditionally protected "navel string forest" 30 *rai* and burial ground 10 *rai*.

** Only eight households of 47 had paddy fields (in 2004).

Ban Pang Hin Fon (Tambon Pang Hin Fon, Mae Chaem District)

Ban Pang Hin Fon had been inhabited for about a hundred years. It received an official status in 1979 when it was registered as a village. It was situated at the elevation of about 1,220 m in Mae Tum watershed. The village site is a cool upland area between the mountain tops. Forests were largely degraded in the immediate surroundings of the village but, according to the Care report, the village had almost 7,800 *rai* of forest (Table 6). Mountain tops around the village were reforested with pines.

Administratively, the village consisted of two hamlets Ban Pang Hin Fon and Ban Tung Yaa, which had a common village headman and village committee. As the central village of the tambon, it had better infrastructure than most of the other villages, including a health centre and a school, but no other sources of electricity than some solar cells provided by the government.

The number of inhabitants was at the time of the research 280, and households totalled 55 in the two villages combined. Four ethnic groups occupied the village: the Hmong and the Karen were the largest groups, but also some Lawa and Thai households existed. The Hmong who had inhabited Ban Tung Yaa hamlet for about fifteen years belonged to the Blue Hmong sub-group. The Karen of the village belonged to the subgroup of White Karen. About 60% of the households were Christian and 40% Buddhist.

Table 6. Land use in Ban Pang Hin Fon (modified from Care 2001).

Type of land use	*Area in* rai	*% of land-area*
Conservation forest	5,405	61%
Forest for use (community forest)	2,361	26%
Permanent fields	822	9%
Intercropping	176	2%
Rice fields	65	<1%
Rice and other crops	132	1%
Homegardens	5	<1%
Total	8,966	100%

Major crops in Ban Pang Hin Fon were cabbage, potato, carrot, and tomato, which were cultivated in permanent fields, and upland rice (Table 6). A recent new crop was mandarin grown in an agroforestry system. The Hmong in this area earlier used to grow opium poppy (Care 2001). Currently, they were still engaged in farming, but of the Karen in the village, only about one fifth were cultivating their own fields and the remaining four fifths were working as wage labour.

Ban Ho (Kao) (Tambon Pang Hin Fon, Mae Chaem District)

Ban Ho was a Lawa village situated in the Mae Tum watershed at the altitude of 1,030 m asl. (Care 2001). The village comprised two satellite villages: Ban Ho Kao and Ban Ho Mai, the old and the new village, of which the old village was included in this study. Ban Ho had 473 inhabitants who lived in 74 households of the old village and 16 households in the new village. Some of the villagers had converted to Christianity, particularly in Ban Ho Mai, where a church could be found. Another church, furthermore, was under construction in Ban Ho Kao. Besides Christianity, the Lawa in these two hamlets practised Buddhism and animism.

The main crops the villagers cultivated were upland rice and maize; only a few villagers had paddy fields, and the chief cultivation method was still rotational slash-and-burn. Cabbage had been taken to cultivation only very recently. The villagers used to raise cattle before, but at the time of the study they only had pigs and chickens. Evergreen forest surrounded the village and covered totally more than 7,000 *rai* of the whole village area including a new conservation area and a burial ground that the two hamlets shared. Swidden fields in different phases characterised the landscape around Ban Ho Kao (Table 7).

Table 7. Land use in Ban Ho Kao (modified from Care 2001)

Type of land use	*Area in* rai	*% of land-area*
Swidden area	3,569	50%
Forest (community forest)*	2,575	36%
Permanent fields	741	11%
Rice fields	110	2%
Rice and other crops	20	<1%
Homegardens	2	<1%
Total	7,017	100%

* Conserved burial-ground forest included

Ban Ho Kao had a school for young children and a teacher from outside the village but no health service. The road connecting the village to the main road to Mae Chaem was passable although in a poor condition during the rainy season. The only source of electricity was one solar cell in the middle of the village, which could provide energy merely for signal-receiving equipment for a satellite phone system. The Care project and the Queen Sirikit Project were established in the village.

Ban Phui Nua (Tambon Pang Hin Fon, Mae Chaem District)

Ban Phui was a Hmong village that had a population of 511 inhabitants in more than 70 households. It was located at the elevation of 1,200 m, in an area where opium poppy growing used to flourish previously (Care 2001). The main road connecting Mae Chaem and Mae Hong Son Province passed through the village. The villagers moved the village to the current location about thirty years ago (in 1972) from six kilometres away because they wanted to stay closer to their fields and because they were encouraged by the Royal Project. The Royal Project also promoted coffee and white beans for the villagers for growing instead

of opium poppy and for staying at permanent fields. At the time of the study, cabbage cultivation provided the main source of livelihood. The main problem in agricultural production seemed to be the shortage of water during the dry season.

Some area around the village had been reforested and some naturally regenerated. The village was situated in the Mae Suk watershed area. Because of the forest reserve status of the area, the villagers could obtain no land titles. In addition to the Royal Project, the Care had had activities in the village. At the time of the study, only the RFD reforestation activities were going on.

Ban Phui was a relatively wealthy village among the villages studied, and the average income of the households interviewed was the highest in this village. The villagers belonged to the sub-group of Blue (or Green) Hmong. The majority of the villagers were animists and Buddhists; five families had converted to Christianity.

Mae Ya Noi (Tambon Ban Luang, Chomthong District)

The village lay in a mountainous area at over 1,000 m asl. in the Mae Klang sub-watershed of the Ping River (Fig. 7). It was surrounded by a dense evergreen forest within the Doi Inthanon-Ob Luang National Park. The rainfall seemed to be the highest in this village as compared to the other villages studied. Mae Ya Noi differed from the other villages because it had been included in the national park territory already since the 1970s (Isager & Ivarsson 2002, 408).

Figure 7. Mae Ya Noi village is situated within the Doi Inthanon National Park. (Photograph: Minna Hares).

Mae Ya Noi was, moreover, the only one of the villages studied that was involved in the Royal Project at the time of the study. Tomatoes and flowers, for instance, were cultivated using plastic cover within the project. The problem in planting cash crops was, however, that the

road to the village was in poor condition and during the rainy season products could not be transported to the markets. Despite the requests of the villagers, the RFD had given them no hope of road improvement or electricity.

The Hmong of Mae Ya Noi village belonged to the sub-group of White Hmong. They used to inhabit a village in Chiang Rai Province where they had moved through two other places eventually to Mae Ya Noi where they had settled since the 1940s. The population of the village consisted of 402 persons in 60 households. The religion of the villagers was a blend of animism and Buddhism.

The most important crops were cabbage, tomato and chilli with rice for staple food and maize for fodder. The average annual income was, according to Chomthong District Office, 10,450 Baht per household; 85% of the households were reported to live in poverty. The development level[24] of the village as assessed by the District Office was ranked as equalling the lowest one indicating existence of development problems. (Chomthong District Office 2001).

[24] The District Office has a three-step classification of development, and the level of development of each village is defined according to several criteria. Development levels are determined as follows: 1= existing problems, 2=middle class, 3=no problems in the village.

5. RESULTS BASED ON FIELD RESEARCH AND LITERATURE REVIEW: THE UPLANDS AND THEIR INHABITANTS

5.1 Ethnic groups studied

This section will present the ethnic groups studied: the Karen, Hmong, and Lawa[25], and also the Northern Thai. The Karen is the largest of Thailand's upland ethnic groups[26], and the Hmong the second largest. The Lawa are a relatively small group but they are regarded as the first inhabitants of northern Thailand. These were also the most significant ethnic groups in the study area where the Karen actually outnumbered the ethnic Thai and were, thus, a majority in the area (ICRAF 2001b).

Upland minority population

Upland ethnic minority groups comprise of approximately one percent of Thailand's population although it is often speculated that the estimations of the upland minority population are notably lower than the actual figures (e.g. Anderson 1993, 19–21). One reason for this is that many of their members lack the Thai citizenship. Tables 8 and 9 show the population figures of the ethnic minorities presented here, in Thailand and in Chiang Mai Province, respectively. The population growth among the upland minority groups has been 2.9% annually while the national average is 1.2% (FAO 2002). Apart from the natural population growth, immigration is a significant factor. For example, according to the Thailand Government Survey, the Hmong population in Chiang Mai was 4,725 in 1965 (Geddes 1976, 36) but in 1995, the number had increased to 17,198 (McKinnon 1998, 54). Although it must be remembered that the calculation methods may differ and that some of the Hmong may have been issued a citizenship after 1965, these figures indicate that immigration has also taken place.

Table 8. Karen, Hmong and Lawa populations in Thailand in 1965 and 1995. (Sources: 1) Thailand Government Survey of 1965, in Geddes 1976, 36–37 and 2) Tribal Research Institute, in McKinnon 1998, 5.)

Ethnic minority group	*Population in 1965* [1)]	*% of tribal population in 1965* [1)]	*Population in 1995* [2)]	*% of tribal population in 1995* [2)]
Karen	123,380	54.5%	321,900	46.3%
Hmong	53,031	22.5%	124,211	17.9%
Lawa	(not available)	(n. a.)	15,711	2.3%

Tables 8 and 9 also indicate that Hmong villages are relatively large as compared to the other ethnic minority villages. Their number of people per household also seems to be larger than the household size of the Karen or the Lawa. According to this statistical information, the Karen population in Thailand has increased more than 2.5-fold and Hmong population 2.3-fold in thirty years from 1965 to 1995. However, when examining the population figures, it is good to remember that they are inaccurate due to common lack of citizenship, difficulty of counting, and also because of migration of the upland minority people. Because of these reasons, the number of these people is likely to be underestimated.

[25] These ethnic groups are also called with other names, but here the ones are the same as used by the Tribal Research Institute of Chiang Mai University.

[26] Upland ethnic groups refer here to the minorities called hill tribes by the Thai, living basically in the northern upland areas in Thailand and are thus excluding, for instance, the Chinese as a whole group. Ethnic Chinese also live in the northern uplands but they are mostly concentrated in other areas. The Tribal Research Institute categorises as hill tribes the Karen, Hmong, Lahu, Akha, Lisu, Yao, H'tin, Lua, Khamu, Palong and Mlabri, of which the Palong are the latest immigrants to Thailand (McKinnon 1998).

Table 9. Ethnic groups of population in Chiang Mai Province in 1995 (Tribal Research Institute, in McKinnon 1998, 54)

	Karen	*Hmong*	*Lawa*	*Total ethnic upland population*
Number of villages	728	61	25	1,049
Number of households	19,723	2,112	1,814	31,765
Population	106,116	17,198	8,862	174,195
% of tribal population in Chiang Mai Province	60.9%	9.9%	5.1%	

The uplands are not solely inhabited by minority groups but also the Thai have started to move to higher elevation. One reason has been the successful cash crop cultivation in the hills. The middle altitudes are attracting migrants also from upwards: the inhabitants of the highest zone move downwards to find land for cultivation. Furthermore, the upland people also move to the lowlands, particularly to towns, partly because of competition for arable land. The Lawa, for example, assimilate well with the Thai population in urban areas, but some others, such as the Karen, often remain a more distinctive group. (Schmidt-Vogt 1999, 77).

Historical background

Distinctive ethnic identities of the lowlanders and the upland people developed already quite early, with the emergence of lowland civilisations, although the division between the two groups has not always been clear. The uplanders provided the lowland people with forest products and the lowlanders provided them with products such as metal and salt. (Keyes 1995, 19– 20). In addition, drug trafficking often included cooperation between the Hmong and the Thai. Altogether, ethnic minority groups had economic importance for the Thai rulers, and prior to the establishment of the nation state, people belonging to these groups also had some high positions in peripheral administration. (Buergin 2000, 6–7). The economic importance was, however, eroded along with economic globalisation, and already at the beginning of the 20th century the ethnic minorities were regarded as “unsuitable for modernisation and to be left on their own” (Buergin 2003, 383).

Apart from the Lawa, who have inhabited North Thailand already for more than a thousand years, most of the upland ethnic groups have arrived in Thailand from neighbouring countries relatively recently. In fact, most of these peoples have immigrated to Thailand during the past hundred years, particularly after the Second World War (Anderson 1993, 21). The groups have tended to settle themselves at different altitudes: The Hmong mostly inhabited the high elevations from 1,000 to 1,600 m asl. The Karen and Lawa usually occupied the middle altitudes between 600 and 1,000 m. Lowlands below 600 m tended to be the Thai territory. (ICRAF 2001a). Exceptions from this generalised picture have, of course, occurred but because the Thai majority has occupied the best agricultural lands for paddy rice in the lowland areas, the minority groups have often had to settle in the uplands.

When the Hmong and the Yao (another ethnic minority group) migrated to Thailand, opium production increased in the northern uplands. In addition, some of the upland groups were also involved in the teak trade. The upland minorities, however, remained largely uneducated for much longer than the same groups in the neighbouring areas Burma and Indochina. Therefore, it was only well after the Second World War when spokesmen started to appear among the upland minorities of Thailand. Since World War II, the Thai government concern of the immigration of upland people into the country increased, and the government started to promote the integration of upland people into the state for strategic reasons. (Keyes 1995, 19–26)

Categorisation based on agricultural practices

Agriculture provides characteristically the main source of livelihood for the upland dwellers. However, additional income is often needed and it is commonly obtained from handicrafts and wage employment (FAO 2002). Traditionally, upland agriculture has been based on the slash-and-burn method. A well-known classification of northern Thailand's upland cultivation systems was developed by Peter Kunstadter and E. C. Chapman (1978) who grouped the systems according to a rotation cycle: 1) short cultivation with a long fallow system of the Lawa and Karen, 2) long cultivation with very long fallow system of the Hmong, 3) short cultivation with short fallow period practised by the Northern Thai, and 4) a system of permanent field and tree crops. Variation occurs within these classes; as much variation may exist within ethnic groups as between the defined categories. (Schmidt-Vogt 1999, 77–78). The classification of Kunstadter and Chapman is, nevertheless, still often used although the circumstances during the past decades have altered substantially, particularly due to an increased competition over land resources.

A slightly different approach to swidden[27] systems is to classify them by ethnic groups (Schmidt-Vogt 1999, 77–79): 1) swidden farming of the Northern Thai (*khon muang*) in the foothill zone, 2) swidden farming by long-established upland minorities (Lawa, H'tin, Khamu, Karen) in the middle altitudes, and 3) swiddening by more recently established upland minorities (Hmong, Akha, Lahu, Lisu) at higher altitudes. In practice, different types of swiddens can be found side by side; thus the farming system is not only an ecological choice depending on resource availability but also affected by cultural traits. In introducing this classification, Dietrich Schmidt-Vogt (1999) suggests that a dichotomy between long-established and newly arrived groups is still valid, and thus is the distinction between ethnic groups regarding affiliation to one of the two.

Another grouping of ethnic minorities by agricultural practice is based on opium poppy growing although this practice has been illegal already for quite a long time. This classification distinguishes between traditionally opium poppy and non-opium poppy growing groups, both of which practise swidden farming but using different strategies. The Hmong (with the Yao, Lahu, Akha and Lisu) belong to the first group whereas the Karen and Lawa (as well as the H'tin and Khamu) belong to the group in which traditional farming excludes the opium poppy. Residence patterns of the second group have been regarded as more stationary than those of the opium-growing groups. (McKinnon 1998, 49). Despite opium poppy is not a traditional crop for some upland groups, such as the Karen, they have also practised its cultivation.

The Hmong

The Hmong have their common ancestors in China. They came to Thailand for the first time during the nineteenth century, probably in the latter half (Geddes 1976, 3, 29). The classification of their language has been debated; it was previously classified as belonging to the Sino-Tibetan group, but today it is grouped into the Austro-Thai linguistic group and the Miao/Meo-Yao family (Geddes 1976; Anderson 1993; McKinnon 1998). The name Hmong, which the group uses of themselves, means "free man" (Pake 1987). The Thai often call them Meo.

The Hmong living in Thailand can be divided into three subgroups: the Blue Hmong (Hmong Njua, also referred to as the Green Hmong), White Hmong (Hmong Da or Deaw), and the recent immigrants, the Gua M'ba Hmong, which can be translated as the Armband Hmong,

[27] Swidden/ swiddening is used here as a general term for various agricultural systems utilising slash-and-burn techniques, whether rotational or shifting. Rotational slash-and-burn or just rotational cultivation refers to a farming system, in which cultivation is rotated within the same fields in a cycle of varying length. Shifting cultivation is used to describe a farming system, in which farmers do not necessarily return to same fields but rather move to new sites.

who are actually a sub-group of the White Hmong. These subgroups are identifiable based on their dialects of Hmong language and dressing. Traditionally, the Hmong have inhabited upland areas at over one thousand metre altitude, but instead of the hill tops they have preferred a location in the lee of the hill (Tribal Research Institute, undated). One reason for favouring the highest hills has been that at the latitude of northern Thailand the opium poppy requires an elevation of at least 850 m, and best harvest is obtained above 950–1,000 m (Anderson 1993, 119). Today, the Hmong are also found at lower altitudes due to transition from opium poppy growing to other cash crops and to paddy rice for subsistence instead of maize (Tribal Research Institute, undated).

In Hmong culture, the basic unit is the family. The patrilineal clan system ties together larger groups, and each of the clans has its own traditions. Their religion is traditionally animistic with spirits everywhere. For instance, very tall trees are important because from them the "spirits on high" can easily reach the village (Anderson 1993, 169). The Hmong worship the spirits of ancestors. These ancestral spirits and household spirits are benevolent whereas the demons of the jungle and plains, including the demons of valleys and cities, are malevolent (Jaafar 1975, 68). Some Hmong believe in "Lord of the land", to whom offerings are made in a grove adjacent to the village so that the spirit would protect them and their village (Tribal Research Institute, undated). Nowadays, the Hmong may often say that they are both Buddhists and animists, or just Buddhists because animism is not officially a religion. In addition, a small group of the Hmong are Christians (Tribal Research Institute, undated).

The land is very valuable to the Hmong. A traditional code of land tenure included the idea that the first one to clear the land received complete rights to its use. Cleared land could be rented, sold, donated, and mortgaged, but if the land was left unused, or in case the clearer of the land moved away, the tenure rights were lost. Uncultivated lands in the village area used to belong to the village headman, who is a senior clan member or a clan leader. Land is so important that competition for land can lead the Hmong to conflicts, sometimes even among themselves. (Jaafar 1975, 68–69; Geddes 1976, 149).

Three features used to characterise the Hmong lifestyle according to J. McCarthy (1900, in Geddes 1976, 29–30): firstly, their preference to live in upland areas of above one kilometre; secondly, opium poppy cultivation; and thirdly, a swidden farming system, in which a field is cultivated until its fertility is exhausted. Their shifting cultivation method has been described as a reason for their migrant life style although they may have returned to the same field after a fallow period of varying length (Geddes 1976, 33; Tomforde 2003).

Before the 1960s, when the government launched programmes for rooting out the opium poppy, it was economically important for the Hmong (Tapp 1990, 152). Traditionally, a major share of the opium produced was sold. At the beginning of the 1990s, according to Jean Michaud's (1997) study, the production had dropped considerably and only 28% of it was sold. Michaud calculated that in ten years the villagers had to reduce the production of opium poppy by more than 90%. He states that this meant a significant loss in the opium growers' income.

Growing crops for income thus belonged to Hmong agriculture even before the current domination of cash crops. Cultural changes have, nevertheless, taken place: Opium poppy has now given place to such cash crops as cabbage, and the Hmong have had to settle down permanently in one area. In addition, their income generation strategies have diversified, and they have quickly adopted new agricultural methods (Tomforde 2003, 357). William Geddes (1976, 128) predicted in the 1970s that a permanent settlement would mean alterations in the Hmong economic patterns and social life. It seems, actually, that the Hmong have adapted themselves well to new circumstances. Regardless of adapting well to a new economic situation, they have, however, managed to preserve the main ingredients of their tradition (Michaud 1997; Tribal Research Institute, undated).

The Karen

The Northern Thai call the Karen as Yang and the other Thais call them Kariang. The Karen regard themselves as people of the forest and perceive the people and the nature as one holistic diversity (Tomforde 2003, 354). They live in the western provinces, and have moved to Thailand from Myanmar. The Karen are believed to be among the earliest settlers of the Myanmar uplands, but their origins and migration routes are incompletely known (Rashid & Walker 1975). In Thailand, they have generally been acknowledged to have migrated to the country already a long time ago, even before the Thai in some areas, while the other upland groups (excluding the Lawa) have typically been regarded as newcomers (Chiengthong 2003, 155).

The Karen form four main sub-groups: the Skaw Karen, also known as the White Karen; the Pwo Karen, who may also be called White Karen; the Pa-O or Taungthu, also called Black Karen; and the Bwe or Kayah known as Red Karen. The Karenic language belongs to the Sino-Tibetan language group. (McKinnon 1998, 13–15)

The Karen have permanent settlements, usually at a lower altitude than the other upland minority groups (McKinnon 1998, 14). Their villages have tended to be located near a stream or spring (Rashid & Walker 1975). In case a village became overcrowded, some of the villagers moved together to another place and established a new village. The most important person in the Karen community is the village priest, who is a ritual leader. The role of the village headman is, instead, an administrative one and often an unwanted task because of the conflicting interests that may occur between the villagers and authorities. (Tribal Research Institute, undated).

According to customary land rights, uncultivated land in the community area belonged to the whole village, and only community members were allowed to clear new fields in that territory (Rashid & Walker 1975, 91). Households had usufruct rights to the land under cultivation and a principal right to return to fallow lands they previously have cultivated. This right to fallows was also inheritable provided that the inheritor utilised the land within an appropriate period of time; otherwise the right could be assigned to another household. (Rashid 1975, 102). Unlike the swidden lands, which were communally shared, terraced permanent fields were individually owned. However, a change in the agricultural system has involved adaptation also in the land tenure systems with clearer distinctions between usufruct and ownership rights. (Laungaramsri 2002, 202–3).

In Karen culture, wealth was not measured in terms of silver but of livestock and rice supplies. Their kinship system is, unlike of most other groups, matrilineal, and residence matrilocal. Another particularity compared to many other upland groups is that a Karen family is typically a nuclear family with husband, wife and unmarried children. The family is the most important unit for the Karen. (McKinnon 1998; Tribal Research Institute, undated). The Karen are traditionally also skilful in making traps for hunting and in fishing. Hunting used to be popular among the Karen. (Rashid & Walker 1975, 93).

Many Karen today profess some other than their traditional religion. Buddhism is quite common, and as a result of Christian missionary activity among the Karen, many of them have converted to Christianity. In their traditional animistic religion, the “Lord of Land and Water” is one of the most important spirits. This spiritual force owns the land and everything in it in a certain area and provides protection for the Karen and their village. The ancestral, matrilineal guardian spirit *bgha* is also an important supernatural power which refers to no particular person; instead, each family has a *bgha* of their own. Moreover, the Karen traditionally believed in souls (*kala/ k’la*) that are many in each human being. Certain animals, plants, and even some inanimate objects are also believed to have souls. (Keyes 1995, 51–53; Tribal Research Institute, undated). This forms a basis for the Karen's natural resource management and their conservationist attitude although nowadays the young or urban Karen, for instance, may have adopted new ways of thinking (Tomforde 2003).

Usually, the Karen have nowadays good relationships with the neighbouring Thai (Tribal Research Institute, undated). They used to prefer isolation from other communities but they, nevertheless, have had good relationships also with adjacent Lawa, for instance (Rashid & Walker 1975, 93). They have assimilated to Thai society to a lesser degree than many other ethnic minorities.

The Lawa

The Lawa[28], who the Northern Thai call Lua, are a small group which only lives in Thailand. Their communities are mostly found in southwest of Chiang Mai and southeast of the neighbouring province capital Mae Hong Son. Their exact origin and ancient migration routes are incompletely known, but it is believed that they came to northern Thailand in the mid-600s from the south and were the first inhabitants of northern Thailand. However, approximately 900 years ago they had to move to the uplands when the Thai arrived to northern Thailand from the north. Their language is grouped to the Mon-Khmer languages of the Austro-Asiatic linguistic group, but it has also been suggested that the Lawa language could be classified as a separate group. (Kunstadter 1966, 140; McKinnon 1998, 36–37)

The Lawa culture is said to have some traits from ancient Indian culture (Kunstadter 1988, 97). Their religion is traditionally animistic and includes worshipping of ancestors. The spirits of dead ancestors are believed to take care of and protect the living. Benevolent and malevolent spirits are everywhere. Today, traditional beliefs exist side by side with Buddhism, but those living in isolated villages are strictly animists. Some of the Lawa have converted to Christianity. (Tribal Research Institute, undated).

The Lawa have traditionally had a permanent settlement unless the harvest of wet rice becomes insufficient with loss of soil fertility. In that case, they may have in the past changed the location of their village every ten to fifteen years. (Tribal Research Institute, undated). According to customary land rights of the Lawa, swidden land used to be property of the whole community, but usufruct rights to swidden land were inherited. Land could be taken for cultivation in the village area if the farmer's family had always lived in the village; otherwise, permission from a village headman had to be asked. Irrigated fields could be individually owned. (Kunstadter 1966, 139).

The population growth among the Lawa was low until the 1950s when the mortality began to decrease. In addition, marriage customs and encouragement of out-migration from the villages affected population growth. A tradition of inheriting land rights ensured that the traditional farming system could continue for several centuries. (Kunstadter 1988, 102). Their traditional farming system has to date become non-existent in many villages or, at least, the fallow periods have shortened. Among other reasons (to be described later in this chapter), this has also been a result of the migration of the Karen and the Hmong, who have gradually occupied those lands that used to belong to Lawa territory between the Lawa villages. In addition, because of the government's forest policy, the Lawa can have no legal claim for their ancestral lands. (Kunstadter 1988, 102–4).

Contacts of the Lawa with other groups include primarily the Thai and the Karen. Intermarriage with these groups is possible. Actually, intermarriage with other ethnic groups has increased because of changes in community structure and influences from outside. The Lawa who lived in isolated villages used to have contacts mainly with those non-Lawa groups that resided adjacent to them. The ones living in close contact with the Thai have assimilated with them and their economic systems. (Kunstadter 1988, 104; Tribal Research Institute, undated).

[28] In Kanchanaburi, one group is also called Lawa but they should not be confused with this upland group although they have the same ancestry. In addition, the Chaobon, who are found in Petchaboon and Nakhon Si Thammarat Provinces, are sometimes also called Lawa, but they have only a remote relationship with the group discussed here. (Tribal Research Institute).

The Northern Thai, Khon Muang

Thai speaking people started to enter the mainland Southeast Asia from southern China before the 900s. Their migration can be described as “gradual infiltration”, and they occupied also areas that were settled by other ethnic groups. The Thai formed territorial units that were chiefly ruled by families. These units were called *muang*. (Keyes 1995, 14, 74–75). Thus, the Northern Thai started to call themselves *Khon Muang,* which means the people of this country, hence, differentiating themselves from people living in the hills and in other countries. This name also makes a distinction between the Northern Thai and other Thai people. It was originally just a geographical definition but has been given also ethnic connotations in the modern nation state. (Rhum 1994, 3).

The Thai chiefs expanded their territory, and at the end of the thirteenth century, they succeeded to take over the Mon Kingdom of Haripunjaya that had dominated the area. As a result, a new kingdom was founded, which became a new dominant power of the region. (Keyes 1995, 75). The capital of that kingdom Chiang Mai was founded in 1296. This was the start of the classical era or the so-called Lanna period in the history of northern Thailand. The Burmese, however, conquered northern Thailand in the mid-1500s, and their reign lasted until 1770s when the Northern Thai became vassals of the Siamese (i.e. the people of the central plains). This two-hundred-year period of Burmese rule had an influence on spirit beliefs, for instance. (Rhum 1994, 4–5).

The kinship system and inheritance of the Khon Muang are bilateral, but ancestral spirits are usually transmitted matrilineally. A spirit elder (*kao phi*) is most often a woman. The head of a household, typically formed by a nuclear family or a family with a married daughter, is normally a man. (Rhum 1994, 15–22). Land, particularly the paddies, was traditionally in the ownership of a kinship group with the same grandparent spirits. Inheritance of land was matrilineal, but this system has changed and now men and women inherit equally. Private farming lands used to be divided into four groups: household plot (*thi ban*), paddy (*thi na*), vegetable and fruit garden (*thi suan*), and land for field crops (*thi rai*). In addition, community lands exist, for example burial grounds and community forests. (Ganjanapan 1994, 610–2).

Belief in spirits (*nat,* a Burmese term for spirits) belongs to Thai culture. In addition to benevolent spirits which protect places and people, malevolent spirits are believed to exist. Ancestral spirits and household spirits are examples of groups of spirits. Some spirits, such as nature spirits, are indifferent to humans unless annoyed. Therefore, when the natural vegetation is cleared, offerings to spirits must be made to avoid them becoming angry. Otherwise, spirits are presented with sacrifice to keep them happy because they need to eat and like to receive gifts. This belief in spirits exists side by side with Buddhism, and certain rules are followed: For example, during the Buddhist Lent it is strictly prohibited to sacrifice to spirits. (Rhum 1994, 42–45, 76)

The Northern Thai are Buddhists but they have their own forms of religious traditions. Their Buddhism may have some elements from Hinduism, and actually animism is still playing a significant role for the Northern Thai. For example, the conception of *khwan*, which are 32 in all human beings and which many other living things also possess, precedes the arrival of Buddhism and is also today a central concept in the Northern Thai worldview. One has to avoid any escaping of *khwan*, and if it escapes, rites must be performed to gain it back. This form of Buddhism combining supernaturalism and Theravada Buddhism is more common than orthodox Buddhism in northern Thailand. The traditions have begun to become eroded in cities due to the growth of urban areas and an increase in tourism. (Renard 1996, 160–3, 177)

The worldview of the Northern Thai includes the opposition of nature and culture (Rhum 1994). The urban Thai used to avoid going into the forest because malevolent spirits were believed to live there and also other dangers in the forest were feared to harm one’s *khwan*

(Renard 1996, 170). Furthermore, Richard B. Davis (1984 in Rhum 1994, 104) states that the *khon muang* lack the conception of natural beauty; instead, they believe that things are beautiful because they are human handiworks.

Thai society is hierarchical (Klausner 1997, 6). It is based on three pillars, which reflect the "Thainess": race (*chat*), religion (*sasana*) and king (*mahakasat*). The term *chat* refers to uniting all ethnic groups as Thai citizens and members of the Thai race. Religion tended to refer to Buddhism, but other religions have been included as well. The King is central for the Thai identity, and Thai kings have worked for integration of all ethnic groups to the Thai state. (Renard 1994).

5.2 Upland minorities, development programmes and forest policy

Thailand's forest policy manifests conservation as the main objective, but it has also had other purposes. One underlying objective has been the wish to control upland minority groups who have been viewed as potentially critical for the national security and who have often been blamed, also for political reasons, for forest loss (Ganjanapan 2000, 22, 157). Many people of these ethnic minorities lack the Thai citizenship and land rights, and several upland communities have lived under the threat of relocation. It can be suspected that the reason for this situation is more economic or political than conservation (A. Ganjanapan 1998).

A conservation policy, particularly in relation to protected watersheds, connotes an ideal of untouched forests without human settlement. In practice, however, many people live and find their livelihood in the forests. The livelihood of many upland people has been based on rotational slash-and-burn or shifting cultivation, which has been commonly regarded as a serious hazard to the forests[29]. (Tomforde 2003). Furthermore, opium poppy has been grown in many upland fields. To oversee and solve these problems of "hill tribes", as the northern upland minorities were called, the government established the Hill Tribe Welfare Committee in 1959 (Renard 2001b, 6). In the same year, the term 'hill tribes' (*chao khao*) was given an official status (Sturgeon 1999). This term refers to the place of these people outside the Thai society. It has its foundation in the dichotomy between forest people (*khon pa/ chao pa*) and urban people (*khon muang*[30]). The term 'forest people' includes notions of wild and uncivilised, and with the rise of nationalism after World War II, the difference between them and urban people was gradually regarded as a threat to the Thai nationhood. (Laungaramsri 2002, 39–45).

The existence of the so called "hill tribe problem" (*panha chao khao*) was also identified. This problem refers to certain aspects associated with upland minorities: firstly, depletion of natural resources, related to the fact that the upland minority groups often settle in the areas of the remaining forests, and to opium poppy cultivation; secondly, the threat of insurgency, immigration from neighbouring countries, low standard of living among these groups, and, as a result of these factors, lack of loyalty to the state. (Laungaramsri 2002, 43–48). The government has implemented several development programmes to address such problems in the uplands.

Statelessness among the uplanders

The Thai Nationality Act of 1911 determined the citizenship to belong to all those born in Thailand. In 1962, the Ministry of Interior intensified the issuance of citizenship to improve the national security and to distinguish the refugees who had escaped fighting in the neighbouring countries from those born in Thailand (Chiengthong 2003, 155). Nevertheless, inhabitants of remote areas were excluded because officials could not reach them. Besides, many upland

[29] For discussions about the harmfulness of shifting cultivation to the forests in Finland and insular Southeast Asia including the historical perspective, see Myllyntaus et al. 2002.
[30] *Muang* refers to ordered society.

minority people, especially the opium-growers, viewed no advantage of possessing a Thai citizenship. The option to receive the citizenship for persons born in Thailand remained until 1972 when the government started to require proof of the residence of the paternal grandfather for citizenship. In some cases, if a member of a minority group was unable to prove this, citizenship was revoked. However, the new government elected in 1973 issued identity cards to minority people in order to integrate them with society, but a continuous flow of migrants arrested these efforts. Moreover, the illicitness of residing in protected forests hinders uplanders to receive citizenship even if they otherwise fulfil the requirements. (Renard 2001b, 52–54).

The northern uplands were regarded as virtually uninhabited for a long time, and before the logging boom the government was rather unconcerned of who resided in that territory (Sturgeon 1999). Still in 1970, the government seemed to show very little interest in the uplands and their inhabitants (Renard 2001b, 6). Growing forestry interests, however, changed the situation, and ignoring the residents of the upland forests was no longer possible (Sturgeon 1999).

The first action to be taken was to settle the migrating upland minorities and try to integrate them into the society (McKinnon 1998, 64–66, 71). For this purpose, they were granted residence permits (allowing legal stay for five years and freedom to move within the district of registration) and hill tribe ID cards, the underlying aim of which was to better control them. The hill tribe ID cards are, however, only the first step to full citizenship because formal land rights are excluded and a bearer of this ID is considered as non-Thai and "less than full citizen". Moreover, a person with a hill tribe ID is unable to receive a high school diploma and, therefore, has restricted access to good employment. (Sturgeon 1999).

Many of the minority people in the northern uplands still lack the Thai citizenship; estimations of the number vary a great deal. In the 1980s, it was estimated that 40% of the of the upland minority people were lacking citizenship, but in later estimations even as high figures as 70–75% have been suggested (Vaddhanuphuti 1996, 22; Buergin 2003). The Thai Department of Public Welfare reported in 1999, in accordance with previous estimations, that about 40% of the so called hill tribe people are without the citizenship (Vandergeest 2003). Actually, the Ministry of Interior continues to be cautious in granting citizenships to those upland people who are not yet citizens because of illegal immigration of the minority the people from neighbouring countries and suspicions of illegal trafficking, (FAO 2002). Furthermore, even full citizenship guarantees no land rights, which are lacking from many uplanders (Tapp 1990, 150–1). On the other hand, the lack of citizenship for people who reside within the state boundaries is problematic also from the government's point of view due to questions of control and welfare of the people and also because of a fear that the lack of citizenship and land rights may pose a neglectful attitude towards the forests.

Lack of rights to forests and land as a result of the government forest policy leads to further marginalisation of the upland minorities. This affects the forests in two ways: On the one hand, traders and investors may contrive to take control over land and forests while the local inhabitants have no tenure rights. On the other hand, the communities in forest areas have increased their efforts to protect the forest in order to avoid relocation. (A. Ganjanapan 1998)

Opium poppy growing

Areas of northern Thailand belonged to the so called Golden Triangle, which used to be an important centre of opium production. The opium poppy growers were chiefly upland minority groups. (Renard 2001b, 1–9). Of the groups studied, the Hmong have traditionally, already since the late 1700s in China, cultivated the opium poppy (Yang 1982, in Pake 1987, 14). Opium poppy was cultivated for income and medicinal purposes; mainly, the crop was exported (Renard 2001b, 7). Growers' own consumption was traditionally restricted primarily to medicinal use; opium was regarded as an effective treatment for pain, and it was also used in treatments for diarrhoea, cough and sleeplessness. Opium used not to be a drug for

pleasure for most of the upland groups, but medicinal use can lead to addiction. (Anderson 1993, 123).

Originally, the Karen and the Lawa cultivated no opium poppy (McKinnon 1998, 49). Many Karen, however, began also to cultivate it although usually on a smaller scale and primarily for their own use (as a medicine and a drug). In addition, the Karen often used to work as wage labour for opium growers. (Rerkasem & Rerkasem 1994, 9–10).

The sale and smoking of opium was proclaimed illegal throughout the Kingdom in 1958. The control was further tightened by the Narcotic Control Acts of 1976 and 1979. Despite this, several upland groups of the north still continued the cultivation of opium poppy, and it played an important role in their economy. Only just since 1985, the government started to enforce the laws strictly. (Geddes 1976, 208–10; Rerkasem & Rerkasem 1994, 10)

Although declared illegal, opium poppy was tolerated because H. M. the King suggested that alternative means of livelihood should be first provided. As a result, crop replacement programmes were launched, but it proved difficult to find substitutes that could be competitive with opium poppy. Although unpredictable yield was a disadvantage of the opium poppy, it had many benefits from the viewpoint of upland farmers: it was easily storable and transportable, provided a good income, required no complicated technology, its cultivation cycle fitted well to labour demands of rice and maize, it yielded well in poor soils, required no fertilisers or other chemicals, it could be cultivated longer on the same site than many other crops, and it required no irrigation. A small plot was often used for opium poppy growing, and rice and maize could be cultivated on the same plot in the subsistence economy. Medicinal uses were a further advantage. Storing enabled farmers to sell their product when the price was highest. (Dearden 1995; Renard 1994; 2001b). Thus, the substitutes needed to be similarly low-technology demanding and well-transportable in order to be competitive and applicable. In practice, because finding substitutes to meet all these requirements was difficult, markets for the new produce were often lacking and had to be created. (Renard 2001b, 59).

Many efforts, both internal and external, have been made to eradicate the opium poppy. A vigorous attempt to stop the opium poppy growing in the uplands was made in 1973 when the Thai government together with the United Nations started a pilot programme titled the Thai/UNFDAC Crop Replacement and Community Development Project. It was targeted to replace opium poppy with other cash crops in northern Thailand. The project included agricultural extension, reforestation and construction of roads to improve the access to markets. The project was renamed in 1980 when it became the Thai/UN Highland Agricultural and Marketing Project (HAMP). (Renard 2001b, 78–86). The United States Agency for International Development (USAID) also funded upland projects aiming at replacement of opium poppy as did some other international organisations (Kaosa-ard 2000, 8). Some of these projects achieved the aspired results in replacing opium: For example, within the Thai-Norway Highland Development Program, the area of opium poppy fields was reported to have decreased from 831 hectares to 25 hectares in the four years between 1984 and 1988. (Anderson 1993, 44–6).

In general, the replacement projects were actually commonly regarded as unsuccessful although the projects reported the opium production to have dropped considerably (Anderson 1993; Kesmanee 1994). Apart from the benefits of opium poppy as a crop, wider-scale factors contributed to an increase of poppy growing at the beginning. Firstly, restrictions in the area of rotational cultivation forced farmers to produce more opium poppy in order to be able to buy rice. Secondly, when the farmers needed a loan, they could have it only from the merchants because they lacked land ownership, and the merchants could demand the payment in opium. (Renard 2001b, 28).

The era of tolerance and soft approach ended in the mid-1980s when the government started to actively eradicate the opium poppy growing with a heavy hand (Renard 1994). Soldiers were assigned to destroy the crop (Rerkasem & Rerkasem 1994, 10). Consequently, opium

poppy was in many places replaced by cabbage, which is also easily transportable and provides good earnings. A disadvantage with cabbage, however, is that it is perishable and difficult to store. Even more crucial is, though, that to yield well cabbage requires chemicals and irrigation. This has resulted in a decline in the farmers' net income. Other common substitutes have included peach at the beginning, followed by red kidney bean, coffee and cut flowers. In addition, the projects have provided taro, potatoes and tomatoes, for instance, as replacement. Anyhow, no crop could provide the upland farmers a higher income than did opium poppy. (Renard 2001b, 57).

Today, the law on drugs is strict and the cultivation of opium poppy is rigorously controlled. The government has succeeded in reducing the growing of opium poppy, but sales and the use of opium as well as other drugs such as heroin and morphine produced from opium, remain a part of the problem also faced by the upland minorities. The problem of drug abuse is even more severe today than it was in the past (Dearden 1995). Now a bigger problem than the abuse of opium is that of the refined product heroin.

The area studied used to belong to a major poppy-growing region in Mae Chaem (Renard 2001b, 92). Today, the former large-scale production is reduced to some villagers' small and well-hidden remote fields basically for own opium use. However, some effects of poppy growing still exist although it has almost completely been stopped. Those Karen who were opium addicts worked as wage labour in the opium poppy fields of the Hmong and cultivated themselves only small farms for their subsistence. As a consequence, the Hmong occupied the unused land and the Karen were left with their small pieces of land.

Shifting cultivation as a scapegoat

Slash-and-burn cultivation on steep slopes used to be regarded as a backward farming system practiced because the uplanders were ignorant of the benefits of terracing (Chiengthong 2003, 157). Upland farming was associated with opium poppy growing, and another major problem of this cultivation system was considered to be the threat it posed to the forests – and consequently to hydrological stability (as discussed in Chapter 3). These were the reasons for including eradication of slash-and-burn in the priority issues of the government. To distinguish between the swidden systems of the uplanders and the ethnic Thai, a term *rai lu'an loy* ("drifting swidden fields") was in the 1950s taken into official use. It referred to a moving lifestyle and had a negative connotation of instability and disloyalty. (Laungaramsri 2002, 178–86; Buergin 2003, 383). Hence, slash-and-burn cultivation was banned in the 1960s. Violations of the ban were, however, largely looked the other way until the end of the 1980s when the enforcement was tightened. (Tomforde 2003). This has meant, apart from tightened control, also programmes for promoting farming in permanent fields. The threat that slash-and-burn cultivation is thought to pose to the forests and to the national security has induced, apart from the government, also some environmental NGOs and lowland farmer organisations to advocate relocation of upland communities, or at least circumscribing their activities (Vandergeest 2003, 28).

Resettlement was also one attempt to integrate and "develop" the upland peoples of remote areas, but various problems, such as lands unsuitable for farming and inadequate infrastructure at relocation sites, appeared in implementation (Rerkasem 2003, 333). Plans to relocate villages from the protected forest areas have been strongly criticised and raised much opposition. Despite this, for instance from the Doi Inthanon–Ob Luang National Park, villages have been evicted as late as in the first half of the 1990s (Ganjanapan 2000, 215). The main critics of relocations have been the villagers themselves, their interest groups, and human rights organisations. Even a threat of relocation has caused tensions locally and between the villagers and the government. (Tapp 1990, 161–2). Because of the strong criticism, relocation is today avoided. Instead of relocation, Reiner Buergin (2000, 13–15) claims that the aim of strict restrictions in land use, for example those posed on the Karen in the Thung Yai Naresuan Wildlife Sanctuary, is to pressure the people to move voluntarily.

Traditional farming systems based on field rotation, even if they had been environmentally sound, have become problematic because of the decrease of the forest area and an increase in competition for land. Anyway, from the government point of view, the result of slash-and-burn cultivation is deforestation, no matter who practices it and how. Although the general opinion globally has changed from a dominant idea of destructive slash-and-burn cultivation towards an emphasis on local technical knowledge, the attitude of the Thai government has remained largely the same. (Laungaramsri 2002, 186, 214)

Upland development programmes

The "hill tribe problem" has been an incentive for the government to implement upland development programmes; since the 1950s, and even more vigorously since the 1970s, numerous government projects have been carried out in rural uplands. The most significant of these development programmes targeted to uplanders has probably been the Royal Project, which still continues.

The royal family sponsored the earliest programmes for opium poppy replacement. King Bhumibol himself toured the Chiang Mai Province for this purpose for the first time in 1958 and since then has regularly met upland minority people and learned about their lives. This was a start of the work the royal family has done with the upland people in the North. (Renard 2001b, 73). In 1969, King Bhumibol initiated the Royal Project, which was at first launched under the name The Royal Hill Tribe Assistance Project and has officially been The Royal Project Foundation since 1992. The main component of the Royal Project has been to promote growing of temperate crops (which are unsuitable for lowland fields) in the uplands (Rajani, undated). The aim is to make the farmers self-sufficient with an adequate quality of life and to rehabilitate the forest and the watersheds. The initial objectives of the project were to (Royal Project Foundation, undated):

1) "[P]revent forest destruction in the watershed areas by the hill tribes and to promote reforestation";
2) Halt slash-and-burn-cultivation and opium poppy growing and provide suitable crops for replacement to "ensure that the hill tribes stay in one place";
3) Provide training for the hill tribes in upland agriculture;
4) Study crops and animals, and conditions for marketing to generate higher income;
5) Provide assistance to the hill tribes in education, health care and family planning.

HM the King defined in his Royal Address in 1974 that the underlying objective of the project was to provide education for the hill tribes and make them self-supporting. He also stressed the importance of opium poppy eradication from the upland fields in the fight against drug trafficking and abuse. In addition, he pointed out that slash-and-burn cultivation is a threat to the environment and the whole country. (Royal Project Foundation, undated)

The development programmes for "hill tribes" differed, particularly at the beginning (and to some extent even today), from those targeted to other rural communities (Sturgeon 1999). This was because they were directed towards solving the "hill tribe problem" and, thus, focussed on preventing deforestation, eradicating opium production and improving the national security. For example, improvement of the road network in remote areas has served the interests of national security (Ganjanapan 2000, 157). Moreover, educational projects that aim at teaching people to read and write have had an underlying objective to increase the loyalty of the minorities to the government. In these educational projects, Thai has usually been the language of teaching, and minority languages have been devalued. (Kaosa-ard & Rutherford 2002, 37).

Hmong communities have been targeted for more development projects than, for instance, the Karen communities. This is because of the Hmong tradition of opium growing and because of their moving lifestyle and pioneer shifting cultivation system (Kesmanee 1994). The farming practices of the Hmong have been viewed as causing more deforestation because of the mobility than the farming systems of the more sedentary groups. Furthermore,

the tendency of the Hmong constantly migrate and, even more importantly, their potential connections to communist insurgents, caused the government to put a special effort to strengthen their loyalty to the state.

In addition to the special concerns related to the Hmong, different notions on the cooperation of the upland groups have underlain the uneven allocation of development projects. Roughly, two types of groups are distinguished: those which are easy to cooperate with (submissive groups), and those which are not (aggressive groups). The Karen, and also the Lawa, for example, are included in the first category. Unresisting and conservationist are the adjectives often associated with the Karen. In contrast, the Hmong are viewed as belonging to the second category, difficult to cooperate with. They are typically described as market-oriented non-conservationist resource users. (Laungaramsri 2002, 53–54; Tomforde 2003). These conceptions are also reflected in attitudes towards their traditional farming practices. The Karen farming systems are regarded as less destructive and as a smaller problem because the Karen are labelled as conservationist subsistence farmers.

The real problem is considered to be the Hmong because as business-oriented people they are thought to be eager to constantly enlarge their cash crop fields. Thus, especially the Hmong have been accused of deforestation. The study of Claudio Delang (2002), however, shows another viewpoint: His calculations suggest that the area the Hmong cultivate is actually less than one percent of the upland area (above 600 m). Even when the fallow area was included on top of the figure, Delang concluded that no evidence of the Hmong causing deforestation existed. Anyhow, the Hmong have had a particularly problematic relationship with the Thai state (Michaud 1997).

Permanent settlement was hoped to improve political control over the upland people, and the programmes especially in the 1970s aimed at preventing insurgency. The basic idea of the programmes to integrate the minorities into society has remained the same, but the means have changed: The focus has shifted to also improving the uplanders' welfare; for example, health and education projects have been implemented. (Tapp 1990, 156–60; FAO 2002). Since the 1990s, the approach that can be called alternative development and that emphasises the importance of participation has increasingly been the trend (Renard 2001b, 102–7). In general, the attempts of integration that respect the minority cultures are preferable than efforts of assimilation (Chandraprasert 1997, 85–89). The hopes included in development projects to assimilate the uplanders into a Thai identity have largely failed, and one reason has been branding of the upland minorities as non-Thai and threats to the Thai nation and the forests (Roth 2004a).

Despite the development efforts, problems still appear; for instance, a legal recognition of land rights is still lacking (Ganjanapan 2000, 203). In addition, the quality of the projects has varied considerably, even within the same village. Particularly at the beginning, the problem was often poor coordination. The projects were criticised for spending a large proportion of the money on administration, which may have benefited some officials rather than the villagers (Rerkasem & Rerkasem 1994, 8; Chandraprasert 1997, 88–89). An attempt to improve the coordination among the institutions involved in upland minority issues was made in 1982 when a committee was established to implement the "hill tribe" policy. The name of this committee describes well the main concerns: Committee for the Solution of National Security Problems involving Hilltribes and the Cultivation of Narcotic Crops. The objectives of this committee have formed the official hill tribe policy, including the issues of integration, drug control, population growth and improvement of living standards. (Buergin 2000, 8).

It has been problematic for the development programmes and policy formulation that the upland minorities of the North have in the public discussion often been referred to as one, more or less homogenous group (Laungaramsri 2002, 44). As has been described earlier, these minorities actually in many aspects form a heterogeneous group, and evident differences occur between them, and even within one group, in terms of culture and practices of natural resource management. Variation also exists in the agricultural practices of the upland groups, but the government has often failed to take this into account. Nevertheless,

those who still reside in the rural uplands commonly seem to share certain features: agriculture remains to be the main source of livelihood, poverty is still a common problem and marginalisation of many people continues, especially as a result of lacking a complete citizenship. Prejudice of the majority also still appears. A limited access to Thai citizenship, lack of land rights and infrastructure, and inadequate access to basic social services, such as education and health services, are the main reasons why the upland minority people have been considered as belonging to the most disadvantaged groups in Thailand (FAO 2002).

The upland development programmes have for their part connected remote upland villages – in which agriculture was largely on a subsistence basis although cash crops, such as opium poppy, were also cultivated – into a wider economic sphere that is constantly altering (Pettenella 2003). Economic as well as socio-cultural changes are posing challenges to adaptation. The attempts to solve the "hill tribe problem" by efforts to integrate the hill tribes to the society has, according to Pinkaew Laungaramsri (2002, 47), failed, and, moreover, the hill tribes are still viewed through the stereotypes that have prevailed past four decades. Table 10 summarises the problems of upland minorities from their own and the government point of view.

Table 10. A summary of the "hill tribe problem" from the government viewpoint, means to solve it, and problems from the uplanders' point of view.

Conceived problem	*Means to solve the problem*	*Problems according to upland minorities*
Opium	Eradication of poppy growing and crop replacement; drug rehabilitation	Finding good substitutes; drug abuse
Insurgency/ national security/ disloyalty to the state	Improved infrastructure, control, efforts of integration	Distrust of the government, control of activities
Deforestation	Stopping slash-and-burn cultivation, permanent settlement, relocation	Losing of forest benefits; losing of agricultural land, need to use chemicals; insecurity of land rights
Illegal immigration	Control, permanent settlement, hill tribe IDs	Lack of citizenship and land rights
Poverty	Development programmes: income generation, health, education etc.	Poverty: circle of debt, lack of money for education and health services, etc.

5.3 Increased pressure on land and forest resources

In the past, Thailand used to have abundantly land per inhabitant, but now the utilisable land is scarce (Rigg 1993). During the past decades, in particular, significant changes that have generated increased pressure on land resources in the uplands have taken place. These include government development and conservation policies with a focus on uplands, as well as economic influences, for example, caused by road construction, which makes markets more accessible and results in changes in land use. In addition, population growth, both natural and that due to immigration from lowlands and neighbouring countries, has contributed to an increase in pressure on land. In the study area, the main causes for increased competition over land and forest resources were: expansion of protected areas,

reforestation, and population growth causing an increased need for agricultural land in an area with steep slopes and limited availability of arable land (cf. Rigg 1993; Dupar & Badenoch 2002) (Fig. 8). The problem of increased competition for land exists at the village level and the villagers have to compete over the land with other local people and also with outsiders, such as businessmen and migrants from the lowlands (Ganjanapan 2000, 206).

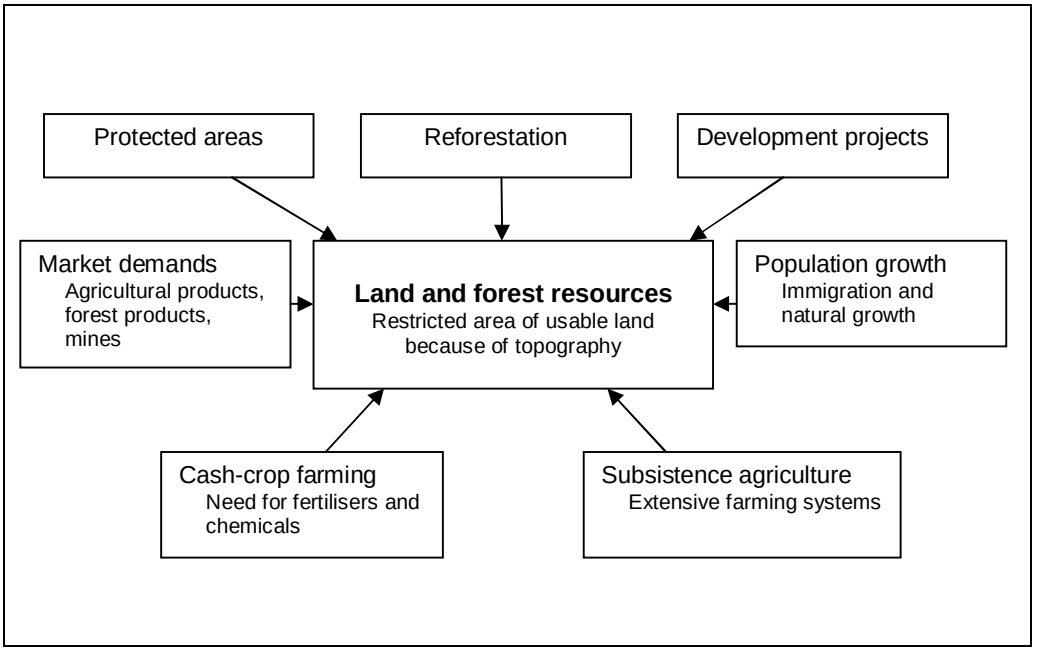

Figure 8. Pressures towards land and forest resources in the study area.

An increased demand for land means for the villagers that less arable land is available, which means that they have to abandon the field rotation or shorten the fallow period. Shortening of the fallow periods accelerates erosion, increases the competition with weeds and the risk of pests and diseases, and decreases the soil fertility and consequently the crop yields. (Turkelboom & Van Keer 1996, 1–13). If field rotation is abandoned, fertilisers and agricultural chemicals are necessary to ensure productivity harvest after harvest, and cash crops need to be grown to for buying the necessary inputs and for purchasing rice and other food. Poor farmers often become indebted, and as a result, the pressure to enlarge the farms at the expense of forests increases. Furthermore, chemical residues in the run-off may contaminate the environment and threat the biodiversity (Niesten et al. 2004, 28).

Disputes over land among upland communities have appeared because of inadequately determined community boundaries and unofficial demarcation (Rerkasem 2003, 338). However, land is still often considered abundant, but more scepticism appears about the sufficiency of water. Therefore, watershed protection to control the water flow and quality has gained much attention in the environmental agendas. Competition for water has also increased local conflicts. It has been studied whether upland land use affects the lowland water resources and two main explanations have been provided: pine plantations on former grasslands and, more significantly, the expansion of irrigated rice farming have contributed to increased water retention in the upstream. (Kaosa-ard 2000, 9).

The effects of changes in land use in watershed areas, such as deforestation and changes in farming systems, have been debated, as explained in Chapter 3. Effects, however, have included conflicts among the local population. In Mae Chaem, conflicts have been minor and

less violent as compared, for example, to Chomthong District. Tensions arouse mainly after the major changes in land use after opium poppy eradication, introduction of new cash crops, and declaration of the forest reserve. Conflicts over water resources between upstream and downstream villages occurred in Mae Chaem in 1992–1993 when the rainfall was exceptionally low. (Aparasit 2001, 29–31; Uparasit & Isager 2001, 18).

In Chomthong, a widely known example of the dispute concerning effects of land use change in the uplands was the case of Pa Kluay village where conflict emerged in the 1980s between the upland Hmong and the lowland Thai. Actually, the dispute started when the Hmong of Pa Kluay prevented illegal logging by some influential lowlanders. This dispute grew into a larger conflict over the watershed. The Hmong of the village shifted from cultivating opium poppy to cabbage and, as a result, expanded their farming area and started to use more water and biocides in their fields. The lowlanders started to blame them for water scarcity in the lowland fields, which eventually lead to a conflict situation between the two groups. (Laungaramsri 1999, 118–20). This has not been the only case in which upland minorities have been blamed for disturbing the hydrological balance or for contamination of waters with biocides, but it received a lot of publicity and catalysed a discussion on the impacts of changes in land use on hydrology and the role of uplanders in such events.

In the villages studied, the major transition regarding the land use has been the shift from rotational slash-and-burn cultivation to permanent fields, and the increase in the area of protected forest. The reasons why the farmers had abandoned traditional swiddening included the competition for arable land and legal restrictions in protected areas. The RFD can regard fields left as fallow for more than two or three years as forest and consequently their clearing becomes illegal although in practice this is the policy mainly in the buffer-zone area surrounding the Doi Inthanon National Park (Uparasit & Isager 2001, 16). Basically, the change has been first from slash-and-burn cultivation to sedentary subsistence cropping and then to cash cropping. Many of the former opium poppy fields have been reforested. Rotational slash-and-burn cultivation is still practised in the area to some extent but much less than before; introduction of new crops has increased the use of agricultural chemicals; and contract farming has gained ground among upland farmers.

Traditional farming system of the Karen and Lawa

In the upland areas with relatively steep slopes, slash-and-burn cultivation methods used to be the only viable choice[31] (Luukkanen 1982). Traditional farming systems of the uplanders were typically based on the slash-and-burn method with a limited cultivation period on the same plot. As mentioned, variations were numerous and the system may have differed within one ethnic group, but some generalised descriptions of the systems can be made. Uplanders themselves wanted to make a distinction between the rotational cultivation that is practiced by the Karen and the Lawa (Fig. 9), and the shifting cultivation that the Hmong used to practice. The difference thus highlighted is that in rotational cultivation the same plots are cultivated again whereas in the shifting cultivation system new areas are encroached on when the previous fields become infertile.

Traditional farming systems of the Karen and Lawa included paddy fields, where the topography allowed, and swidden fields. The swidden system of the Karen was essentially a subsistence system with rice as the main crop (McKinnon 1998, 14). The farming system has been characterised by a short cultivation period of one or two years, during which several varieties of rice as well as sweet potatoes, yams, legumes, gourds, chillies, maize, millet and cotton and many other crops were grown (Rashid & Walker 1975, 93). Intercropping of legumes, such as cowpea, and vegetables has been common in the fields of the Karen (Prinz 2004). However, for instance in Ban Yang San, maize was a relatively recently introduced crop. Crops used to be planted at different times so as to ensure that enough workforce was

[31] Furthermore, terracing often requires more labour than swiddening limiting the choice between the two systems in many upland communities (Chiengthong 2003, 157).

available at the time of harvest. Growing several varieties of rice and stretching the planting period were hoped to reduce the risk of crop failure. (Kunstadter 1966; 1978).

Figure 9. Some Karen and Lawa still practiced rotational slash-and-burn cultivation in the uplands of Mae Chaem. Harvesting of upland rice took place in November, and trees left in the fields had the purpose to accelerate forest regeneration. (Photograph: Minna Hares).

After cultivation, a long fallow period followed; it lasted for at least 6–7 but even 12–15 years[32]. At the early fallow stage, some grazing could take place. The fallow was supposed to be long enough for soil fertility to recover, and forest regeneration was promoted by leaving stumps and some robust trees in the swidden fields. Trees on stream-sides between the fields functioned as firebreaks and were therefore not cut. In addition to serving as seed sources, the uncut strips served to prevent erosion. (Kunstadter 1966; 1988; Schmidt-Vogt 1999, 80). Burning was done carefully in order to protect the fallow areas, and the forest above the cleared fields was left undisturbed (Tribal Research Institute, undated). Before burning the field, firebreaks were cut around the area to be burned (Kunstadter 1966).

In the traditional system, swidden fields rotated but the villages were sedentary. In site selection, the secondary forest was preferred because the primary forest was hard to clear and because of the powerful forest spirits that lived there (Kunstadter 1966; 1988). For the Karen, selection of the new cultivation site was a significant step; traditions were carefully followed and omens observed because the balance of the nature was important to maintain (Trakarnsuphakorn 1997, 211). The Lawa used to spare also the teak forests because the soil in them was regarded as unsuitable for rice. (Kunstadter 1966; 1988). The forest areas left intact were mostly located on hilltops and ridges (Schmidt-Vogt 1998).

The traditional farming systems of the Karen and Lawa are usually described as rather similar. However, Peter Kunstadter (1978, 83) observed some differences in the swiddening

[32] Schimidt-Vogt (1998) has reported fallow periods of up to seventeen years long in the isolated Lawa village of Ban Tun in northern Thailand.

practices of the Karen and Lawa in the villages he studied. He reported that the Karen were not as careful with fire and in preserving trees in watersheds as the Lawa. In contrast, Mohd. Razha Rashid (1975, 102) states that the Karen take “utmost care” to control the fire when burning a field. This just illustrates that farming systems differ between communities and subgroups. Dietrich Schmidt-Vogt (1998) also noted some differences in swiddening systems between those Karen and Lawa villages he investigated: In the Karen village each household had a field of its own while the Lawa cleared only one swidden area for the whole community. In the Karen system, the cultivation period may have been as long as ten years if a household had enough labour to control the weeds. Furthermore, the Karen tended to leave fewer relict emergent trees on their fields and to do it more randomly than the Lawa. (Schmidt-Vogt 1998, 140).

The Karen and Lawa villages studied used to have a basically similar rotational slash-and-burn cultivation system, usually with one year’s cultivation period and six-seven years of fallow depending on site (cf. Schmidt-Vogt 1999, 80). They also used to leave large trees in the cleared fields in order to accelerate the forest regeneration. Sometimes the Lawa farmers, who seemed to have favoured the longest fallow periods among the villages studied, planted bamboos in the field when leaving it fallow so as to speed up regeneration. Fallows were utilised for feeding the domestic animals: cattle, buffaloes and chickens were finding their food from the young fallows and chickens could also stay in the old fallows, which had vegetation too dense for cattle. Wild animals, such as wild pigs, were hunted in the fallows; old fallows were said to have been particularly good for birds. Upland rice was the main crop but in the same field several other crops were cultivated as well. Opium poppy was cultivated not only by the Hmong but also to some extent by the Karen of the villages studied.

The Lawa, who still were allowed to continue their slash-and-burn cultivation in Ban Ho, referred to their site selection criteria by saying that in the forest with large trees the soil was fertile. The Lawa in Ban Ho still practised traditional rotational farming with upland rice and other crops in mixed cropping systems. Several varieties of planted species were grown. Rotational farming was coordinated in the village, and each family cultivated a plot in the adjacent area. If a family wanted to cultivate a separate piece of land ignoring the joint decision on the farming area, it had to pay fines. However, this would have been anyway disadvantageous to the family because in the adjacent fields the workforce was shared but a lonely farmer would have had to hire extra labour. Crops were also exchanged when necessary.

Traditional farming of the Hmong and the Northern Thai

The traditional swidden system of the Hmong has been categorised as a pioneer system because the fields were preferably established in the primary forest. However, in northern Thailand today, primary forests are no longer available for cultivation and pioneer farming in this sense is inapplicable. The traditional system was based on long cultivation and very long fallow periods. The cultivation period depended on soil fertility and therefore varied considerably from site to site, between four and fifteen years. A long cultivation period is usually a more viable system at high elevations, where the Hmong commonly reside, than at lower elevations because of moister and cooler climate and more fertile soils due to an increased accumulation of soil organic matter. Despite this, the secondary growth is dominated by grasses, and only gradually woody plants start to emerge. (Schmidt-Vogt 1999, 81–82). In general, the Hmong system used to be more complex and more labour intensive than the systems of the Karen, Lawa or Northern Thai. It included, for instance, a more thorough preparation of the soil before planting (Kunstadter & Chapman 1978, 12).

The main cash crop of the Hmong was opium poppy, and the main subsistence crop was upland rice. Other crops, which were often intercropped with the main crops, included maize, buckwheat, sugarcane, yams, gourds, beans, tobacco, banana, onion, hemp, cotton, castor beans, chillies, fruit trees, and sometimes small plots of millet or sesame. Maize was used

mainly for feeding the pigs, some of which were sold for additional income. (Jaafar 1975, 69; Tapp 1990, 152)

Because of poppy cultivation, the altitude was the chief criterion for site selection in traditional Hmong farming and, consequently, fields were cleared in the upper watershed areas. The area cleared for poppy fields was, on the other hand, generally only one or a couple of *rai* in size, and after two or three years of cultivation it was left as fallow for at least several years. During the rainy season, maize could be planted in the field that used to grow opium poppy in the dry season. Poppy was planted when the maize harvest was mature. At the time maize was harvested, the weeding was done for poppy. Rice could also be grown in the same plot.

The cultivation systems that the Hmong in the villages studied used to practise varied to some extent. The Hmong in Ban Pang Hin Fon used to apply a rotational farming system with a cultivation period of some two or three years or harvests depending on the soil fertility. Returning to the same field depended on the number of plots; the purpose was to leave the area for a time long enough to allow the trees to grow big. In Mae Ya Noi and Ban Phui, the Hmong farmers did not necessarily return to the same plot or if they did, the fallow period was long. Field rotation was also practiced, for example, between three or four plots which had been under cultivation for two or three years. Opium poppy was in the past a typical cash crop in each Hmong village studied. For example, the villagers of Ban Phui used to be engaged in opium cultivation at the former location of the village. In addition, common crops in the Hmong fields were rice and maize. Because the Hmong grew more cash crops than the Karen, they sometimes needed to buy rice from the Karen.

The swidden method of the Northern Thai has been described as a system with short cultivation and short fallow periods. Soil becomes easily infertile because of the shortness of the fallow periods, during which the forest is unable to recover and the secondary growth is dominated by small trees and shrubs. This method tended to be regarded as supplementary to irrigated fields, and sometimes swiddening was a preparatory phase for permanent irrigated fields. (Kunstadter & Chapman 1978, 7). The Thai in Ban Lau also used to practise rotational slash-and-burn farming alongside with cultivating paddy fields. They grew upland rice in these swidden fields. As one interviewee remarked, in the past they planted crops in the forest. Their system usually had a three-year fallow period. Upland fields were appreciated together with the paddies because people could thus grow several other crops in addition to rice. Upper watersheds and the headwaters were left uncultivated as well as the areas around spirit houses. Thais of Ban Lau seemed to had had, similarly to Kunstadter's and Chapman's classification (1978), a shorter rotation cycle in their traditional system than did the Karen or Lawa.

Villagers' views of agricultural change

Intensification of agricultural systems and shift to cash crops had had cultural and economic impacts on the villagers' lives, which will be further explained in the following sections. Interviews revealed the significance of agricultural change to the villagers, and it was referred to in many interviews; traditional cultivation systems and crops were compared with the current ones.

Slash-and-burn farming was no longer practiced in most of the villages, for the last ten or fifteen years, according to the villagers, although fire was still used as a tool in farming. In Ban Ho the traditional system was still practised although in a restricted form. The forest officials tolerated this system in Ban Ho, provided that the conservation forest was clearly demarcated and left untouched. In other villages, some field rotation was practised in smaller scale: cultivation of plots every two years occurred. In addition, crop rotation was applied in an attempt to maintain the productivity of the soil.

Those swidden systems still practised to some extent in the Karen and Lawa villages have been renamed as rotational bush fallow cultivation because the cultivation periods are longer

and the fallow periods shorter than those in the traditional systems of these groups. In bush fallow farming, the area is cultivated for one to eight years and then left fallow for three to seven years. (Care 2001; Uparasit & Isager 2001, 13). The villagers in Ban Ho regarded that in some places even seven years can be too short a cycle for the soil to recover. They also had a shortened rotation cycle because the number of plots had decreased due to conservation. They had divided their land into three categories as the government officials requested, but in that process each family in the village lost at least one fallow plot. While the rotation cycle used to be from seven to ten years, now it was five or six years or even shorter (see also Rerkasem 2003, 335).

The responses implied that rotational slash-and-burn cultivation was stopped only when the government officials imposed a strict enforcement of the law. As a villager of Mae Ya Noi stated, the villagers had abandoned slash-and-burn agriculture ten years earlier when "the police came and made them stop". Extensive farming systems in Mae Ya Noi had ended mainly because of the national park; now field rotation could take place between two plots and crops were rotated to maintain the soil fertility. Several villagers told that they discontinued the swiddening because the government prohibited practising it and that it was banned because it destroys the forest. It was explained that the authorities took control of the swidden areas and now a licence was required to expand the farms. In Ban Yang San, many of the villagers would have liked to return back to the rotational system, even with a shorter rotation period than in the past – to avoid the use of chemicals, they reasoned. The farmers of Ban Ho also regarded that they would avoid many problems if they were allowed to continue rotational farming. But the future appeared insecure. It was commonly felt that the government lacked knowledge about rotational cultivation and therefore sought to halt it.

The main factor that people regarded inducing changes in agriculture was the government conservation policy. Another commonly referred reason was population growth. These two factors were pointed out as reasons for the decrease in farm land availability, and together with the ban of slash-and-burn cultivation, for making people to move over to permanent farms. The change had been possible in villages that had viable alternatives to traditional farming systems. It was, furthermore, implied that slash-and-burn cultivation was practised by those who had no land of their own.

The interviewees often referred to clearing the forest for fields in the past. A Karen woman in Ban Yang San stated that they used to cultivate a large area that produced insufficiently, whereas now the fields were smaller but cultivated more intensively and with chemicals. The swidden areas used to be more than twenty *rai* whereas now the average farm size was ten *rai*. Hence, the shift of agriculture from rotational cultivation to permanent farms has also meant a shift to smaller agricultural areas. On the other hand, the field cultivated at a time in the traditional rotational system tended to be small also because it was supposed to produce chiefly for subsistence, whereas monocropping of cash crops in permanent fields tends to require larger areas (Rerkasem 2003, 325). One reason for this development was the increased need of cash.

Cultural change along with agricultural transition was also indicated – not only in farming methods and planted crops but also in time allocation. Growing cash crops, such as cabbage, takes more of the farmer's time than the cultivation of opium poppy or farming just for subsistence. Thus, in the past, people had more time for cultural activities, such as music and handicrafts, and they had more time, for example, to visit the neighbouring villages. Money was now needed more than before and consumerism was gaining ground. Particularly, for the Karen and the Lawa the change from subsistence to cash crops has meant a cultural change. Because money was needed, people grew cash crops, and for growing cash crops they needed money to buy the seeds and chemicals. Traditional systems of exchanging seeds, agricultural products and labour were vanishing; activities in cash crop cultivation took place at the same time and required much labour.

One cultural change was that the number of cattle had decreased: in the rotational cultivation system animals used to graze in new fallow areas which now were largely non-existent.

Moreover, for those Karen who practised animist beliefs, rituals related to rotational farming system were important and some of them still maintained small upland fields to perform the rituals. Old beliefs have had to be abandoned because of restrictions of land use. For instance, the Karen believed that some accident will happen if the swidden plot was returned too early to in the rotation cycle. The culture of these upland farming peoples used to be intertwined with swiddening systems in many ways and, therefore, the disappearance of traditional cultivation methods has also meant the disappearance of many cultural features and related environmental literacy. For example, in the swiddens of a Karen village more than twenty traditional varieties of rice could be found; varieties were traditionally exchanged between villagers, and within a family a certain variety may have been inherited (Sirabanchongkran et al. 2004). The abandonment of traditional farming systems and the emergence of outside interventions has thus led to loss of crop genetic diversity, knowledge of the varieties, and some cultural traits.

In addition to the agricultural change, tourism has also become a source of social and cultural changes and has for its part also increased the competition for land. Tourism has, for example, increased the lowlanders' interest in purchasing land in upland areas. (McKinnon 1998, 65). However, tourism has involved not only negative but also some positive aspects: economic changes in the ethnic communities had, in fact, made these upland minority groups to play a significant role in the earning of foreign currency (Tapp 1990, 162). In Chiang Mai city, for example, the products of the upland people were important selling lines to tourists (Chiengthong 2003, 160).

New cash crops take over

A need for alternative crops has become evident since the change from rotational cultivation to permanent fields and also to replace the opium poppy. At first, the government promoted such new cash crops as beans and coffee as substitutes for poppy, often introducing them first in Hmong villages. The profitability of many of these new crops was, however, low, and people started increasingly to grow cabbage[33]. Its planting had expanded some ten to fifteen years earlier. Some farmers had directly substituted cabbage for opium poppy since it could be grown in the same fields and was also promoted by the government. Villagers lacked information on alternative crops and chose the ones that the government had introduced. Cabbage was a typical cash crop particularly among the Hmong in the area: only two of the Hmong interviewed, both young farmers from Mae Ya Noi, lacked cabbage from the list of crops they grew. In contrast, only two of the Karen interviewed did grow cabbage, both were living in Ban Pang Hin Fon, a village with mixed ethnic composition.

The Hmong, in particular, expressed that they change crops with market price fluctuations. Some Hmong were also concerned of what alternatives they will have when growing of cabbage is no longer profitable. They indicated a wish to find another crop whose market prices would not fluctuate as much as those of cabbage. Information on alternatives better suited for the area, as one informant put it, was hoped for. One interviewee in Ban Phui described the change of agricultural systems from opium poppy to cabbage in his village as follows: "People cultivate now permanent farms. After the village moved here, we have no longer practised rotational cultivation. In the former location, the villagers were engaged in poppy growing. When we moved here, the villagers started to grow coffee and white beans, now we grow cabbage." Farmers had, however, already started to look for more profitable alternatives to cabbage.

For the Karen and Lawa, cabbage and maize were more recent newcomers in the fields. In the Lawa village Ban Ho, people had just started growing cabbage and some families had begun to cultivate onions. Cash crops did not belong to their traditional farming system. Hence, these new crops also brought along further changes in the cultivation methods: they

[33] Besides *Brassica oleracea* (white cabbage), *Brassica chinensis* (pak choi) and Chinese kale (also a form of *Brassica oleracea*) were cultivated.

required tillage, agricultural chemicals and monocropping. Because the Lawa in Ban Ho could still continue with their rotational cultivation, they had managed to maintain their variety of subsistence crops seemingly well.

In the Thai village Ban Lau, which was situated in a valley and had had no opium poppy cultivation, cash crops had also changed. This was because of market forces, but the decrease of the area of available farming land had also had some effect. The villagers used to cultivate cotton, but this practice had ceased because of the population growth. Subsistence crops were the same as in the past, such as pumpkin, beans and maize. The major factors affecting agricultural practices and products in Ban Lau had been improved infrastructure and an increase in the number of vehicles for taking the products to the market. The change of crops was chiefly visible in cash crops which had been introduced whereas crops for consumption had basically remained the same.

Several new crops had thus been introduced to the upland farmers. Due to the government's incentives to farmers and agribusiness to grow these cash crops, especially maize and soy bean, their production had increased (Delang 2002). The Royal Project has played an important role in introducing new crops in this upland area and, for example, tomatoes, potatoes and fruit trees were commonly cultivated. In addition, Care Thailand had encouraged the cultivation of fruit trees. Moreover, the farmers had followed the example of others and made their own experiments. One example could be found from Ban Pang Hin Fon, where farmers had started to grow mandarin orange trees as their own experiment.

Communal agricultural extension services also encouraged growing of new cash crops, such as fruit trees, coffee, pumpkins and soy bean. Temperate crops were recommended particularly for lands at higher than five hundred meters above sea level. The idea was to utilise the biophysical advantages of the uplands (Rerkasem 2003, 334). In addition, extension workers introduced new farming systems to the villagers. A new system suggested by the King was also promoted in the villages although it was meant only for farms larger than five *rai* and its applicability to uplands was uncertain.

Agricultural extension had further affected the change of crops, especially in the Hmong villages. Although it seemed that extension was insufficient, particularly regarding the use of agricultural chemicals, information on new crops had been spread to some extent. A response of a Lawa man suggested that in agricultural extension in Ban Ho what they received was actually promotion of certain crops: "They tell us what to cultivate." Anyway, the extension services were mostly concentrated on Mae Ya Noi where the Royal Project was implemented. Extension included training on growing cabbage and other vegetables, such as tomatoes and sweet peppers. Some villagers called the temperate crops that the Royal Project had introduced, also including fruits such as plum and peach, as winter fruits.

Introduction of new cash crops that tend to require monoculture has decreased the variety of crops grown. For example, in traditional swidden fields the Lawa tended to grow a wider variety of crops than the Thai or Hmong whose fields were dominated by commercial crops. As the rice cultivation area per capita had declined, the farmland under cash crops had increased correspondingly. This may induce also another problem: the effect of some cash crops on forest land tends to be greater than that of traditionally cultivated rice (Rigg 1993).

The transition of land use had also resulted in decrease in the area available for agricultural purposes. For example, one Lawa man explained that formerly "people wanted to cultivate in the origin of water but now it is conserved". Hill tops used to be favoured in slash-and-burn cultivation because they were easier to burn, but now they are protected as watersheds. Many of the former swidden areas had been either reforested when in the fallow stage, or protected from agricultural use and left to regenerate naturally. This was viewed as an issue of conflicting interests between conservation and people's livelihood but also as a positive development.

The forest is even today converted to agriculture although to a smaller degree than before. This was particularly a concern expressed in Ban Lau but also in Ban Yang San and to some extent in Ban Phui. However, it was emphasised that the expansion of farms is now limited, or in places prohibited, because of separation of areas for forest and agriculture. In Ban Ho and Mae Ya Noi, it was, furthermore, mentioned that in the past the forest was used as pasture. This type of land use is very restricted today and, for instance, the villagers of Ban Ho used to raise cattle but now they had only pigs and chickens.

Giving up rotational cultivation has meant a decrease in the number of subsistence crops, and many farmers engaged in cash cropping needed to buy rice for their own use. Rice has remained an important subsistence crop (as Tables 11 and 12 show), although it is increasingly grown in permanent fields instead of swiddens (Uparasit & Isager 2001, 13). However, the significance of rice self-sufficiency has diminished; a considerable proportion of the farmers interviewed cultivated no rice in their fields. In general, ever fewer families are self-sufficient in rice (Uparasit & Isager 2001, 13). Actually, Andrew Walker suggests that in a number of Karen villages of Mae Chaem rice is a minor crop in the upland fields (Walker 2001, 157). The Karen have even turned their rice fields into cash crops, which would only recently have been unthinkable for them (Tomforde 2003, 355).

It seemed that cash crops had commonly gained ground over subsistence crops. One reason for this was that in a smaller area of permanent fields that need chemical input, the requirements for greater cash earnings are obvious. On the other hand, several studies indicate that many upland households have not been self-sufficient in rice even in the past (Dearden 1995). Nevertheless, the increase in cash crop growing has been a substantial change for the Karen, who have traditionally favoured subsistence crops instead of commercial ones, whereas the Hmong have already traditionally mixed both. Therefore, it appeared that among the Hmong, and particularly the Thai, rice was often excluded from the range of cultivated crops, while most of the Karen and Lawa were still engaged in rice cultivation (cf. Tomforde 2003).

Table 11. Main crops in Mae Chaem District (total number of households 13,337) (adapted from Mae Chaem District Office 2001).

Crop	*Number of cultivating households*	*Average production kg/*rai*/year*	*Cultivated area (*rai*)*
Rice	7,800	500	38,965
Soybean	3,000	260	23,045
Vegetables	2,500	2,400	18,125
Fruit trees	3,000	300	11,260

Table 12. Main crops in Chomthong District (total number of households 49,519) (adapted from Chomthong District Office 2002).

Crop	*Number of cultivating households*	*Average production kg/*rai*/year*	*Cultivated area (*rai*)*
Rice	5964	596	22831
Fruits[1]	8008	7913	34206
Vegetables[2]	2831	11611	8023
Soybean	1113	261	3478
Flowers	234	4525	632

1) Longan as the most common fruit, but the figure includes also cantaloup, which were cultivated in 21 households, on 2,800 *rai*.
2) Cabbage, chilli, red onion, garlic, potato and taro.

Increased use of agricultural chemicals

The new cash crops usually require an extensive chemical input (Kesmanee 1994). Another reason for an increase in the use of agricultural chemicals and fertilisers is that many farmers have had to abandon field rotation. Long fallow periods used to ensure the recovery of the soil fertility; short cultivation periods and burning were methods efficient enough to control the weeds. Now, fertilisers and biocides are needed to obtain decent yields in the permanent fields. One reason the villagers gave for the need of fertilisers was that cash crops require tilling of the soil and thus make it more susceptible for erosion. For the traditional crops, only a small hole was dug into the soil at planting and, after harvesting, the rotational fields were left as they were whereas permanent fields require tilling.

Despite the use of chemicals, a Karen women's group in Ban Yang San regarded that the yield was diminishing when they had to keep to the permanent fields. In addition, a claim that chemicals degrade the soil also appeared. On the other hand, two interviewees indicated that the fields produced insufficiently also in the traditional system when no chemicals were used. The input/ output ratio was mentioned as unprofitable in many small farms, which forced people to take loans to be able to purchase more chemicals which would ensure them a decent yield. Furthermore, wrong application of these chemicals has caused health and environmental problems (cf. McKinnon 1998, 65).

Introduction of contract farming has further increased the use of chemicals (Trébuil 1997). In Chiang Mai Province, many canning and food processing companies make contracts with upland farmers (Rerkasem 2003, 326). For example the CP Group[34] was one of the companies that had farming contracts in the villages studied. In contract farming, a company provides seeds, agrees to buy the whole yield[35], and takes care of the marketing. Chemicals they sell are paid back when selling them the harvest. Such crops as maize, cabbage and potato were grown under contracts. However, no mechanisation that causes environmental problems in the uplands had yet taken place in the hill farms.

In Ban Ho, where people still practised rotational slash-and-burn cultivation, it seemed that people used relatively little chemicals in their fields. Nevertheless, the villagers reported that because of a shortened rotation cycle, the density of grasses had increased and the soil fertility had failed to recover during the fallow period. A few farmers used some fertilisers in their swiddens, but one respondent claimed that even fertilisers were not helping and the soil fertility had declined despite of them.

In some cases, not only chemical fertilisers were used but also organic, such as chicken manure. Organic and chemical fertilisers were also used in combination, and farmers were looking for solutions on how to decrease the use of chemicals in their fields. Organic farming had been promoted in the area, and some farmers had started also to make trials of their own. For example, in Ban Pang Hin Fon the farmers reported that they had initiated attempts to minimise the use of chemicals. In the Thai village Ban Lau, problems related to the environment and health caused by chemicals were recognised, but no organic farming seemed to have taken place. A group of women told that they had no solution to the problem yet, but they had heard that planting of legumes could diminish the need of fertilisers. In Mae Ya Noi, for instance, legumes were used to maintain the soil fertility. Crop rotation was another commonly used practice to maintain productivity. The fertility of the soil was in Ban Yang San reported to remain good if only one crop was harvested per year; two harvests would result in soil degradation.

[34] Charoen Pokphand, Thailand's largest transnational company and Asia's largest agroindustrial conglomerate (Goss et al. 2000). Apart from Thai companies, also companies from the USA have had contracts with farmers, for example in potato growing.

[35] Companies used a grid-pricing system, that is high-quality products were paid a higher price and low-quality products forced the farmers to change to products that fell outside the most desired ones (Rerkasem 2003, 326).

Altogether, erosion seemed to be only a minor problem for the farmers in their fields. In Ban Ho, where farming both in rotational and permanent fields was practised, it had been recognised that permanent fields were much more susceptible to erosion than rotational fields. Explanations by the farmers on why erosion was not a problem in a rotational cultivation system included the growing of several crops in the same plot and minimal disturbance of the soil because of the absence of tillage. To prevent erosion in permanent fields, contour lines of long-rooted grass were often used. Another solution was to avoid tillage and just cut the grass (cf. also Turkelboom & Van Keer 1996, 11). Check-dams and furrows were also used to control water flow and thus diminish erosion. When excessive erosion in the fields occurred, the only solution for some farmers was to increase the use of fertilisers.

The use of herbicides was also told to have increased during the recent years. In swiddens, grasses were less common due to rotation and burning. Even in permanent fields people used fire as a tool to get rid of abundant grasses, such as cogon (alang alang, *Imperata cylindrica*). If the grass growth was less vigorous, herbicides were used instead. Moreover, a shortage of labour for weeding also forced farmers to use chemicals. In addition to herbicides, farmers often used pesticides to ensure the harvest in the permanent fields. In general, farmers expressed that chemical use had increased and they even felt that they need to use them in increasing amounts, and that farming without chemicals would be impossible in permanent fields. Some farmers felt that new weeds, insects and harmful fungi had appeared after giving up traditional farming and starting to use chemicals. The traditional cultivation system was often considered better (especially among the Lawa and also the Karen) because it required no artificial chemicals. In Ban Yang San, the villagers even blamed the government for promoting chemical use, and a men's group suspected agricultural chemicals as being too big a business to be limited by the government. They themselves were trying to reduce the use of pesticides and to seek an alternative because that would benefit also the environment in the long run.

Negative effects of chemicals

Agricultural chemicals were blamed for damaging the environment and human health. Health problems mentioned included skin problems, rash and very dry skin. Problems occurred particularly if farmers had bare feet. Allergic reactions were also mentioned, even so severe that hospital care was needed. It was thought that chemicals make people weak. One interviewee, moreover, suggested that agricultural chemicals can cause cancer.

Of the environmental effects, impacts on animals, soil and water were mentioned. Furthermore, herbicides were blamed for killing some useful plants as well. The chemicals were said to worsen the quality of soil and make it lose its fertility. Some interviewees even had a view that chemical fertilisers were harmful for the soil. Chemicals were also blamed for contaminating water in rivers. In particular pesticides were regarded as water pollutants. A concern was that water animals may die as a result of this contamination. Some villagers suspected that also other animals, such as birds, can suffer from ill effects of chemicals. In general, agricultural chemicals were regarded as harmful for the environment. Only three old persons from Ban Lau and Ban Yang San saw no harmful effects of agricultural chemicals.

A group of Hmong women in Ban Pang Hin Fon suggested that those chemicals that may harm the health possibly would, according to their observations, also harm the environment. In spraying the chemicals, they told, farmers must be careful, work at low height, and take account of wind, because otherwise plants outside the field may be damaged. Besides this, they continued, chickens may die if they eat fertiliser. They preferred other than spray chemicals. A group of Karen women in Ban Yang San described the situation: "Without field rotation yields are diminishing. Thus, ever more fertilisers and other chemicals are required. However, these chemicals have environmental effects: For example, if they end up into river, fish will die, or they may cause pain in the feet. Those chemicals are harmful for health in other ways as well, for instance, if they are inhaled. In addition, herbicides [sic] kill insects,

and when birds eat those contaminated insects, they may also die. And what if a chicken eats a contaminated insect and then a human eats the chicken! Nevertheless, without chemicals we could not cultivate." One Karen woman, furthermore, explained that chemicals cannot be avoided: "If you do not use them, you have to burn, and if you burn, the water supply decreases."

One problem appeared to be that information about the use of chemicals was mainly provided by the salesmen, or people just read the instructions on packages; the lack of agricultural extension on this topic was mentioned. It was even reported that information was achieved only through own trials in fields. Those who were involved in the Royal Project in Mae Ya Noi had, however, access to extension services. Thus, the reality in the upland villages, at least as regards chemical use extension, seemed to be different from the information given in the Agricultural Extension Office of Mae Chaem, where it was told that extension services are directed to all ethnic groups, also to those living in remote villages, and currently carried out in most of the villages (125) in the district territory. It was admitted, though, that extension is provided only in Thai, which leaves, for instance, many women of the upland minority groups without these services. In addition, the extension workers were men. In sum, extension services appeared to be more accessible to lowlanders than to the upland minorities.

An extension officer explained that the upland ethnic groups are interested in extension but they rarely implement the information they are given in practice. This indicates that a more participatory system of agricultural extension is needed. It should take better into account the natural conditions of uplands that require agricultural systems different from the type of the lowland areas and pay attention to the specific cultural and socio-economic features of the upland ethnic groups. The officer interviewed had also realised this problem and noted that, for example, the new system introduced by the King was as such unsuitable for upland conditions; he also said that cultural reasons prevent the Karen for adopting that system because they prefer subsistence farming.

The Agricultural Extension Office had realised the health problems of agricultural chemicals and carried out a project in cooperation with health officials. In that project, traces of agricultural chemicals were analysed in people's blood. In case traces were found, training on the use and handling of the chemicals was organised. This was, however, only an after-treatment and therefore also preventive actions were required. These included, according to the officer interviewed, an attempt to find an alternative to chemical fertilisers and training of villagers in a preservation method without chemicals. In Mae Chaem, the Care also had a project aiming at reducing pesticides in upland farms, primarily targeted on the Hmong. This project included education and training in the use of organic substitutes for chemicals. The Care reported that the project reduced the chemical use in the target villages, and the villagers learned about impacts of chemicals to human health. The villagers, however, regarded organic methods as inconvenient and time-consuming as compared to chemicals. Thus, it seemed that if farmers could afford, they preferred pesticides to organic methods.

From the villagers' point of view, the greatest problem related to agricultural chemicals was, however, the circle of debt which concerned many poor farmers. The market price of cash crops fluctuated considerably and sometimes it was so low that the farmers could not even harvest, which further worsened their situation. A dilemma was that the prices of chemicals went up but the prices of cash crops remained low. Hence, many poor farmers were worried about their livelihood in the future.

In contract farming, the companies sold the fertilisers, pesticides and herbicides to the farmers on credit, which was paid back after selling the harvest. This could have caused economic problems for the farmers if the yield was low. As a group of Karen women explained in Ban Yang San: "Debt is a problem in this village. We must take a loan from the companies and the government to grow maize, but if the yield is not good, we will become indebted because we must buy fertilisers." Economic concerns related to agricultural chemicals seemed occur particularly in Ban Yang San, where the average household income of the interviewees was the second lowest of the villages studied. The villagers reported that some

of them had needed to clear new fields to earn money for fertilisers, and that loans were taken for farming. One farmer explained that it is better to try to reduce the chemical input because it decreases the net profit. One reason for using the chemicals was that urban consumers demand beautiful, faultless products. For example, pesticides were used on cabbage produced for the market but usually not on that grown for own use.

Land rights

Customary land right systems were typically based on usufruct rights of kinship groups. Communities collectively decided upon the rights to use the land. This right remained and could be inherited as long as the land was used. Abandoned land returned back to the community, which could allocate it further. Land security was no problem because subsistence farming was prevailing, and people relied on community ability to guarantee the right to use the land and to resolve disputes if they occurred. (Ganjanapan 2000, 137–8). In the Karen customary system, for example, the whole village territory, containing forests and swiddens, was under community ownership (Trakarnsuphakorn 1997, 206–12). Private ownership also existed in the case of rice paddies, orchards, cash crop gardens, and household compounds (Ganjanapan 2000, 161).

In the study area, land tenure was often impossible because, according to the legislation, all forested land was the property of the RFD which, instead of the local administration, had an authority over large areas (Uparasit & Isager 2001, 9). Basically, the land right situation in the villages studied was that people had no land titles for their rotational fields, but they were able to have temporary or even permanent titles for paddy land. Land rights were problematic especially in protected areas, particularly in Class A1watershed. In areas with an average slope of 35% no land titles or land use certificates could be issued (Sutthisrisinn & Noochdumrong 1998, 53). In addition, the area largely belonged to a protected forest area, which could have no land titles. Hence, only a few farmers in the villages studied owned the land they were cultivating, and, in practice, landlessness in legal sense occurred in each village. However, the sufficiency of land available for farming was of even greater concern for the villagers than the official titles. The farmers seemed to regard themselves not as landless even if they lacked land certificates, as the results of Man-Kwun Chan (1995, 7) in northern Chiang Mai also suggested. Lack of land titles, nevertheless, caused some fear of relocation although that was not an active policy. Moreover, people were unable to take loans because they had no land title.

The villagers had various types of land titles for their paddy fields. Permanent land right agreements were called either green or black depending on the right to sell the land. A black agreement meant that the permit to sell the land had to be applied for from a land officer and a green agreement that no such permit was required. A full title deed, called NS4 or *chanod*, provides the greatest security of ownership and can be used as collateral. NS3 also provides a secure title allowing mortgaging and sale of land (Aparasit 2001, 15). Certificates of Land Utilization consist of different types of certificates with various degrees of security. A document called *bai jong* just states the occupancy of land and contains no ownership status. (Chan 1995, 6).

Temporary land titles could be changed to permanent ones by paying money. Mostly, however, the farmers were unable to obtain more land, which was a concern of many of them, because they were worried about their own and, in the future, their children's livelihood. Only a few farmers had had an opportunity to expand their paddy fields. In the Thai village Ban Lau, however, the situation was better and most of the farmers had permanent land rights and had a possibility to buy more land.

The villagers can be sometimes unwilling to recognise the legitimacy of state ownership of the forest lands and, on the other hand, officials are often reluctant to recognise the customary rights of upland forest dwellers (Ganjanapan 2000, 207). Moreover, overlap and confusion

between legal and customary land rights affect the balance of power within the communities and may lead to conflicts with the RFD officials (Ayudhaya & Ross 1998).

Current trends in farming systems

Agroforestry was a system applied to some extent, primarily by growing crops under fruit trees. This practice seemed to have been well adopted, for instance, in Ban Pang Hin Fon. Both the Care and the government had projects that promoted agroforestry, and also the Royal Project encouraged people to grow fruit trees. Nevertheless, the agroforestry method was not widely adopted although many interviewees grew fruit trees on their farms, and some villagers showed interest in planting fruit trees in the future. In Ban Yang San, fruit trees were commonly grown. One reason was that the Care provided seedlings for the villagers. In Ban Ho, on the other hand, most interviewees indicated that they grew no trees in their fields. Trees were, however, planted in homegardens. In general, it seemed that fruit trees were more often grown in homegardens. One reason for not planting trees on farms was probably the small farm size. Tree planting was also lacking from traditional swiddening systems. Growing of fruit trees seemed less popular in Ban Lau, Ban Phui and in Ban Ho than in other villages. The farmers of Ban Lau and Ban Phui appeared to favour other types of cash crops than fruits.

Currently practiced farming systems showed a tendency of transition from traditional methods to the ones introduced by the government, for instance through the Royal Project. One result of this transition has been the change in the types of cultivated crops, increasingly from traditional subsistence crops to introduced cash crops. Of the villages studied, this was clearly visible in Mae Ya Noi where such crops as tomato, potato and sweet pepper were grown with help from the Royal Project. In addition, lychee, mango and peach were grown. Mandarin was a common crop in Ban Pang Hin Fon. In Ban Yang San, within the Care project farmers grew, for example, mango, jackfruit and lychee. Traditionally, many fruits were gathered from the forest, but now fruits were also produced on farms for selling. The main crops in Ban Phui were, firstly, cabbage and then potato, tomato, onion, and carrot. In Ban Ho, the Lawa farmers cultivated mainly rice in their swiddens, but they had also permanent fields for other crops, such as cabbage, for selling.

Generally, the most important crops in the study area were cabbage, maize and rice. Rice was still the most important subsistence crop but its significance had declined. As many as 44% of 55 farmer households included in this study grew no rice in their fields. Most of the Lawa and Karen still cultivated rice, but less than half of the Hmong and fewer than one fifth of the Thai interviewed did. As often as rice, the farmers grew maize (Fig. 10). In these villages, maize seemed to be more popular within the Thai and Karen than the Hmong or Lawa: In Ban Lau and Ban Yang San every interviewee cultivated maize. It has long been cultivated for fodder, but in recent years it has become a more popular crop due to increased contract farming, which was practised particularly in Ban Lau, but also in Ban Phui, Mae Ya Noi and Ban Yang San. The advantage of contract farming, according to the villagers of Ban Lau, was the easiness of marketing, which could have otherwise been more difficult. Farmers, however, seemed to prefer cultivating on their own; only in economic difficulties they moved to contract farming.

Although homegarden plants were not examined and the study focussed on field crops, the results indicated that the widest variety of cultivated crops occurred in Ban Ho, while in Ban Lau the variety of the crops was narrowest. In comparison among the ethnic groups, thus, the Lawa cultivated the highest diversity of plants, which included more local than introduced crops, whereas the Hmong and the Thai tended to cultivate fewer species, mainly cash crops. The Karen in Ban Yang San favoured more traditional subsistence crops although they had started to grow fruit trees under the Care project, but in Ban Pang Hin Fon, the Karen had started to grow also new crops such as carrots and cabbage. The Hmong seemed to be more ready to adopt new crops than the subsistence-oriented Karen and Lawa, and they also

seemed to be more active in looking for new, more profitable cash crops (cf. Tomforde 2003, 354–5).

Figure 10. Maize was one of the most important crops in the villages studied. (Photograph: Minna Hares).

In general, all the farmers interviewed were to varying extent engaged in commercial farming. Most commonly, people grew crops both for own use and selling. Contract farming was practiced by farmers who could not afford investing in commercial farming of their own.[36] In Ban Ho no contract faming was practiced, unlike the other villages, in which, however, only a minority of households was engaged in contract farming. Those families that had enough money, labour and land cultivated cash crops independently. Crops for subsistence, typically upland rice, were, however, cultivated apart from cash crops. Paddy rice was occasionally grown for selling, but in practice only a few upland farmers had paddy fields.

Income from agriculture was uncertain for the poor farmers whose land area was small and capability to invest low. Many household had ended up in a circle of debt in trying to earn money from cash cropping: They needed to take loans to buy seeds, fertilisers and biocides, and these loans were supposed to be paid back after harvest, but if the yield was insufficient they needed to borrow more. It was not uncommon that the crop was not harvested at all because the expected revenue would have been below the expenses. In addition, the farmers may have to sell their product to a limited number of buyers, which tends to lower the price (Jintana et al. 2003, 259). Many poor people worked as wage labour in other farmers' fields to earn money.

[36] This result is quite the opposite to the argument of Wattanutchariya and Jitsanguan (1992) from Kasetsart University about the profitability of contract farming in lowland farms: They state that profits of contract farmers are much higher than those of the independent farmers. Wiboonpoongse et al. (1998), however, presented results showing that the income from non-contract farming can be higher than that from contract farming but it is more susceptible to market price fluctuations.

Nevertheless, alternative means of livelihood apart from cash cropping seemed to be quite limited. Tourism was one of the options, but people were cautious in their expectations. Those villages that had had tourists had experiences that only a few people in the village had benefited. This may have had caused conflicts inside the village, and the income was dependent on the number of tourists. Handicraft making was another option for earning extra cash, but it was also viewed only as a minor source of income. New, more profitable cash crops were regarded as the only real option for improving the standard of living in rural uplands. Some Karen considered that appropriate means of livelihood, compatible with Karen traditions, should be sought, and livestock was suggested to be one possibility.

5.4 Forest management in the villages

Forest management in the communities rested on the separation of protected and utility forest and agricultural land. The use and conservation of community forest areas was regulated primarily by the village rule and a village committee. The management systems practised were a combination of introduced and traditional systems. Traditional forest management systems consisted mainly of two basic elements: slash-and-burn cultivation (which was previously discussed in this chapter) with multi-purpose fallow forests, and protected areas. Forests of various ages tended to surround the villages. Conservation was based on spiritual and ceremonial reasons (conservation and related conceptions will be further discussed in the next chapter). Introduced systems, however, were currently dominating because of the protected area status and the government focus on the remaining natural forests. In the following, the prevailing management practices in the villages studied will be reviewed.

Land use categories

Land in the villages was divided into three categories: conservation forest, utility or community forest, and land for agriculture. Each village followed this categorisation, and also Mae Ya Noi had a community forest although it was located inside a national park. In Ban Pang Hin Fon, for example, the villagers estimated that about forty percent of the community land area was conservation forest, roughly thirty percent community forest, and thirty percent of the land was allocated to agriculture. Boundaries between various land areas were marked by the villagers, or they were natural boundaries, such as rivers. Villages had their own territories, for whose management they were in practice responsible although the RFD had the ultimate responsibility.

In the area the villagers had defined as protected forest, no trees were allowed to be cut, but usually people could gather non-timber forest products[37], although such areas existed where even that was forbidden. The conservation forest may have been a former opium poppy field that had been reforested. The land category conservation forest also included traditionally protected forests, for example, ceremonial areas or burial grounds, which continued to serve these purposes. This meant in practice that actually more detailed forest classifications existed than the government promoted grouping of the forests in to two classes. In Ban Ho, for example, the protected forest areas, where no trees were cut, were divided into five categories: 1) conservation area, 2) watershed, 3) headwaters, 4) village yards, and 5) burial ground. The conservation forest was often located in a significant watershed or at the source of water. According also to Karen traditions, the watersheds have been protected.

The community forest, as its name suggests, could be used only by the members of the community. It served the villagers' needs for wood and timber, and trees were allowed to be cut for own use, for example, for house construction. Cutting of trees was, however, allowed

[37] Non-timber forest products are here defined as covering all the products gathered from the forest including firewood. In the case of community forest it may also refer to wood for household construction needs but excluding timber for any commercial purposes. Here the term 'forest products' means non-timber forest products including wood for domestic purposes. Non-wood forest products refer to products excluding firewood and construction wood.

only with the permission of the village committee, which judged the number of trees that could be cut according to the size of the household. The villagers needed no permission for gathering of non-timber forest products. The location of the community forest, as that of the conservation forest, may have been selected after ecological criteria. For example in Ban Yang San, the community forest, where cutting of large trees was prohibited, was situated along a river. The conservation forest was located in upstream. A buffer zone of community forest or reforested area could also serve the purpose to separate forest and farming land. Previously, some of the villages also used to have a so called spare forest, which was utilised when the community forest was inadequate. A problem with the community forest in places such as in Ban Yang San or Ban Lau was that it largely consisted of bamboo thicket, and, therefore, construction wood for houses was difficult to find.

The current way of dividing village lands was basically quite similar with the traditional system of the Karen. In the traditional land use system, though, the forest considered as community forest may also have included protected areas. Sacred forests were, however, separated from the community forests, and the ritual sites were often situated close to the village (Fig. 11). Larger trees for construction were obtained from the community forest. The forest right next to the village typically served as a toilet and foraging land for pigs. Sometimes the forest may have been further away from the village. Thus, for the Karen the introduced division in land use brought no significant changes. Some Hmong, instead, implied that this system was introduced from outside. The prevailing system was basically similar in each village with the three categories of land use.

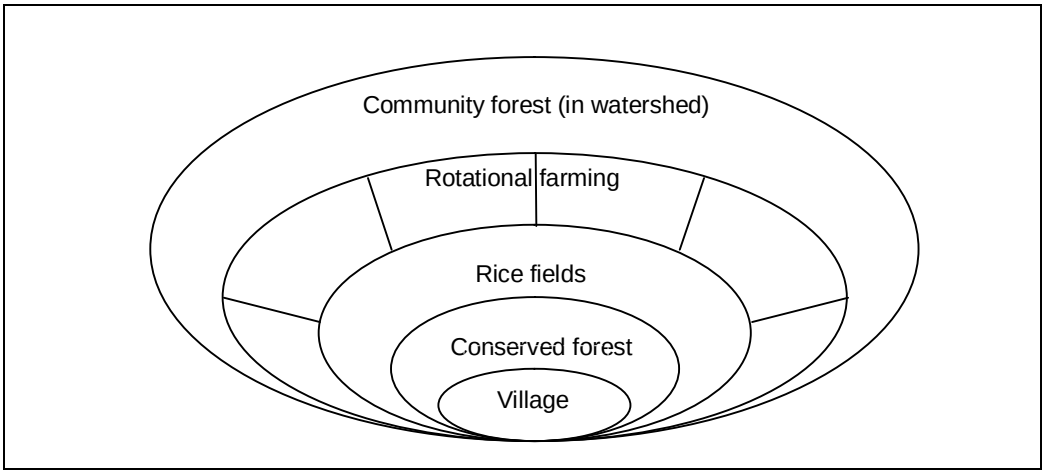

Figure 11. Land use model of a traditional Karen village (based on Tavorn 2004, pers. comm.; a basically similar model was presented in the Karen village Huay Bong). The conserved forest close to the village may include ceremonial sites.

Traditions and rituals in the forest

The forest management traditions of the upland people were founded on the fact that slash-and-burn cultivation and environmental management were closely interconnected. Rituals for land, water and forest took place during various phases of the farming cycle, particularly in the Karen and Lawa communities. These communities typically protected forests in important watersheds, and additional areas or single trees were conserved for spiritual and ceremonial reasons.

A common ceremony that was widely practiced in the area was the Buddhist ceremony of tree ordination, which symbolically ordains a tree as a monk. This ritual, known as *buad paa*, originated at the beginning of the 1990s but is now practiced all over the country. It is based

on the initiative of environmentalist NGOs and Buddhist monks but the performance may vary from place to place. (Isager & Ivarsson 2002, 395). The role of Buddhist monks, in general, includes teaching and praying for the environment.

Before the actual tree ordination ceremony, a suitable tree is selected. Usually, the villagers select a vigorous, well-performing tree that grows in a place "where it would be dangerous to cut trees", to quote one interviewee, and the purpose is to prolong the forest's life. A yellow or orange monk robe is tied around the trunk of the selected tree, which commonly stands at the source of water or near the river. After the ceremony, the cutting of that tree is prohibited and it is protected by spirits. Actually, the tree is not really ordained (because only men can be ordained) but it is sanctified. The purpose of the ceremony is to remind of the equality between humans and other features of nature, to emphasise the importance of conservation and to remind of the necessity of harmonious co-existence with the forest. It may also include planting of trees in the temple area. (Darlington 1998). The RFD supports the practice of this ceremony. In Ban Yang San, for example, RFD officials, representatives from the Care and the Northern Farmers' Organisation take part in the ceremony with the villagers. In Mae Ya Noi, also the Senator of the district and the staff of IMPECT (Inter Mountain Peoples Education and Culture in Thailand Association) participate in the ceremony in the forest.

In addition to this Buddhist ceremony, animistic rituals were performed in the forest. One of these was the traditional Hmong ceremony called *Dong Seng* in Thai, or *Teev Ntoo Xeeb* in Hmong. This was performed in each Hmong village studied for asking the spirits of the forest trees to protect the forest, the Hmong people, their animals and the whole village from all misfortune. The spirits of the trees are offered animal sacrifices, usually a pig or a cow, and the ritual tended to take place after the Hmong New Year that is usually celebrated in December. In Ban Pang Hin Fon, this ceremony was performed in February, and another ceremony, which was a Thai one and quite similar, was carried out in March. Both rituals took place every year, and the Hmong ceremony sometimes even twice a year. Most of the Hmong villagers participated in both, and normally each household donated money for these religious events. The site of *Dong Seng* was an area with large trees, and the Hmong in Ban Phui Tai explained that they could have no Dong Seng because they had no such forest. The sacred site which the villagers were prohibited to enter and a ceremonial ground lied next to it. People could enter the place of the Thai ceremony, but cutting of any trees was forbidden also there. In Ban Phui, spirits of trees received sacrifices every year as well, but it seemed that not all the villages participated in that ceremony.

When the villagers discussed the protecting of the forest, spirits were often mentioned. Spirit trees, in Mae Ya Noi for instance, existed in the forest and indicated an area meant just for spirits. Spirits were believed to protect their areas in the forest and to make people to fall ill if they went to that protected area. The Hmong in Mae Ya Noi performed a ceremony in which a large tree was selected and offerings were made so that the spirits would take a good care of the village. The village headman told that this ceremony was carried out when the community had enough money to perform it. In addition, the Hmong still followed a traditional rule that "beautiful, big trees around the village" should be protected.

The Karen had various kinds of protected forest: watershed forests of three types, the burial ground, and forests for spirit pathways on mountain ridges and wind channels. These conserved forests protected their water sources and the people from storms and forest fires. Some tree species or trees with specific features, such as dichotomous branching, with ant colonies or other nests, or those interwoven with vines, were also protected. (Trakarnsuphakorn 1997, 214–15). The Karen in Ban Yang San had, for example, a sacred forest close to the village. No one was allowed to enter that forest except for three times a year when the villagers had a ceremony there.

Many ceremonies were related to these traditionally protected forests. For example, the villagers in Ban Yang San, where a risk of flooding existed in the rainy season and where the drought could be relatively severe in the dry season, performed a traditional Karen ceremony in the watershed forest and sacrificed to the spirit of the origin of water. This spirit was

regarded as very holy and powerful, and those villagers who cultivated the land made offerings to this spirit. The ritual was aimed at prolonging forest life. The Karen believed that a spirit protects watershed forests and causes misfortune if the forest was disturbed (Rasmussen et al. 2000, 56). Furthermore, one respondent explained that he sacrificed to the sacred spirits of the forest and land (actually the word land in Karen language refers to land with all living things, Trakarnsuphakorn 1997, 206). In addition, rituals that implied the interconnectedness of humans and their environment were practised. For example, a ritual that was still important for many Karen was to tie a placenta of a new-born baby to a tree to have the tree's spirit to protect the child. These trees must not be cut because "the spirits are united".

Not only the uplanders believed in the spirits of the forest but also the lowlanders had traditions related to these spirits. An old Thai woman in Ban Lau described a tradition of offering food to the spirits of the forest to protect it. One Thai man, moreover, explained that they had a ceremony for the forest spirits before they started to collect forest products. In addition, the Thai used to protect the area around spirit houses and leave it uncultivated.

In Mae Ya Noi, a certain tree species was used in a religious ritual, which was performed to pay respect to the spirits of the house. Thus, the forest was providing, apart from a site, also products for rituals; for example, in funerals specific woods were used. A certain part of the Hmong funeral ceremony took place in the forest, and after that the corpse was burned and buried. No common burial ground, however, necessarily exists in Hmong villages, and the deceased are not necessarily buried in the forest but the main criterion for the burial place is its beauty and cosmology. In Ban Pang Hin Fon, the Hmong had a specific burial site with a good view for respected people.

The Karen and Lawa have a special burial ground that is located in the forest, further away from the village than ceremonial grounds. In addition, in Ban Ho a separate burial ground for Christians existed. Its size could vary from just a few *rai* (4–5 *rai* in Ban Yang San) to quite a large area (covering altogether several hundred *rai* in Ban Ho according to the village headman). For their burial ground the Karen tried to find a flat site with robust trees. The burial ground area was under strict rules: no cutting, cultivating or hunting was allowed. Another area with strict rules was the conservation forest which could be used only for religious purposes such as constructing a temple. If someone violated these rules, a social sanction followed. In addition, the Thai also had their burial ground in the forest, about three kilometres away from their village Ban Lau. The burial ground was about twenty *rai* in size and it was shared with three other villages. This was possible because of cremation.

Many traditions and rituals were related to traditional swiddening. The swidden systems traditionally practised by the Karen and Lawa required knowledge for selecting a suitable area for farming and keeping it sustainable; it usually contained environmentally sound practices such as leaving of large trees in the swiddens to facilitate regeneration. For maintaining ecological sustainability, the traditional farming systems included many rules and taboos. One of the rules in the Karen tradition was that in the rotation cycle farmers always shift onwards from one field to the next, never backwards to a field recently cultivated. If a farmer broke this rule, ill fortune was expected to occur. (Trakansuphakon 2002, pers. comm.).

Fallows in traditional swidden system also had many uses while many other forest areas of the Karen community had spiritual and other restrictions on their use; they were, for instance, sources of construction wood for the villagers. During the first four years the fallow provided firewood and food for people and their animals. From a three to four-year-old fallow the Karen could collect medicinal plants, and in addition to being a grazing area for cattle, it also served as foraging area for wild animals. During the following years of a fallow, forest products could be gathered, and it provided a place for wild animals that could be hunted. (Trakansuphakon 2001, 122). Cattle had a role in assisting forest regeneration by keeping the land clear, particularly from *Imperata cylindrica* grass, and thus reducing the risk of fire. Cattle also enhanced the soil fertility with their dung. (Preechapanya 2002, pers. e-mail comm.). Furthermore, other domestic animals, such as pigs and chickens, also found their food from

the forest surrounding the village. This practice is now forbidden in protected forest areas. Regulations of conservation areas now restrict the forest use in many ways; hunting, for example, is prohibited.

A common conception is that the Karen are more traditionalist than the Hmong. In Ban Pang Hin Fon, however, it appeared that the Karen of the village neither practised any ceremonies in the forest nor collected many non-timber forest products. This was because they were mostly wage labourers. In contrast, the Hmong of the village, who were mainly engaged in agriculture, collected forest products, including medicinal plants, and performed ceremonies in the forest. Regarding the Karen in Ban Yang San, the situation was different, and the Karen there had held their traditions. In general, traditional ways of conservation of the Hmong seemed, however, less sophisticated than those of the Karen and Lawa, probably because of their traditionally migratory lifestyle and shifting cultivation system.

The Karen of Ban Yang San held the view that they had taken care of their environment for generations already, and only recently the government had become involved. They explained that their ancestors had taught them to protect forest, and they have, for example, a song about a "poem tree", which tells that to benefit from the forest and water resources people must take care of them. Similarly, the Lawa considered that they had protected their forests since ancient times. Traditional beliefs may help conservation efforts also today as one interviewee indicated in Mae Ya Noi by equalling the conserved national park area with the traditionally protected forest guarded by spirits. The Karen and Lawa interviewed were of the opinion that their traditional way of taking care of their environment had been successful because they had managed to maintain the forest already for generations. In addition, the Thai also held the view that they had started to conserve their forests on their own initiative before the government or the Care came with their conservation projects.

Community organisation and the network of villages

Upland communities of the area studied had formed networks for forest conservation. They were initiated by the Care, which had launched nine Watershed Networks in Mae Chaem District[38]. These sub-district level networks were operated by the Watershed Management Network Committees (Care 1999). All ethnic groups were involved in these networks, which had started quite recently. Each member village of the network had a forest area under its responsibility. The network committee could, furthermore, give people permissions to use the forest of some other member community if the forest resources of that community were inadequate.

The Care had initiated the watershed networks with the purpose to improve the local people's capacity to identify problems and find solutions regarding watershed management. The aim was to gather villages of different ethnic groups within one watershed together in order to manage conflicts. The first one of these networks was the Mae Rak Watershed Network, in which Ban Lau together with seven other villages (altogether six Thai and two Karen villages) were involved. Ban Phui was one village in the Mae Suk Watershed Network formed by twelve villages, and Ban Ho belonged to Mae Tum Watershed Network, which comprised some fifteen villages, including both Karen and Lawa villages.

The villages had formed a network committee, which met on a regular basis. The tasks of this committee could, for example, include organising of firebreak construction, managing of conflicts between villages, or negotiating together with officials on areas that were planned to be included in national park territory. An example of a dispute between villages could be the problem related to pesticide use in upstream that caused problems in downstream or the problem of water scarcity. Such conflicts, although common, were not (yet) reported within the

[38] Watershed Networks have been launched also elsewhere; for example, in Nan Province the Thai-German Project had initiated similar networks (Hoare 2004, 42).

watershed networks of Mae Chaem. The networks working in the study area, however, had not had this kind of problems to solve.

In the Mae Klang watershed, to which Mae Ya Noi belongs, a Watershed Forest Committee had been established within the Northern Farmers' Network. Each village had a forest committee of five to seven members, and the objectives of the committee included monitoring of forest use, surveying, and control of fire. (Poffenberger 2000, 104). Regulations similar to the ones of the Watershed Management Committees could also be found in many village rules.

The institution in each community with the main responsibility for forest management at the village level was the village committee. The village headman, vice-headman and representatives of the villagers formed this committee, which held regular meetings. In the core villages, the village committee elected candidates to the Tambon Council. It also selected representatives for an annual meeting on forest conservation organised by the district administration. One important task of the village committee was to organise the preparation of firebreaks in the forest.

The Tambon Administrative Organisation Act of 1994 had, as mentioned earlier, a purpose to decentralise the decision-making in natural resource and environmental management. It was followed by the Tambon Council Act, which aimed at small sub-districts, as the ones studied, while the TAO Act was targeted to more developed sub-districts. The goal was that the administrative bodies of the tambons could operate financially independently in the designing and implementing sub-district development plans related to natural resource management. The governing body of TAO was the TAO Council, whose members included a sub-district headman (*kamnan*) and the headmen of the core villages, and a health volunteer. The Ministry of Interior appointed three TAO officers so as to ensure observance of the policy and legislation. (Care 1999)

Rules of forest use and conservation

Each village had its own village rule which consisted of regulation and sanctions for disobeying (see also Poffenberger & McGean 1993, 44–45). Traditional rules for natural resource use had also existed in many villages for regulating tree cutting, gathering of forest products, fishing and hunting. The Karen, for example, had a rule that prohibited hunting of certain animals, such as giant hornbills, gibbons and pythons (Trakarnsuphakorn 1997, 216–17). The Lawa, similarly, had several traditional rules for hunting. These rules constituted the basis when the villagers formulated for themselves written rules with the help of officials or NGO staff.

The rules varied from village to village and could cover various aspects. For example, the village rule of Mae Ya Noi covered not only natural resource use but included also regulations concerning drugs, shooting, violence, gambling and participation, whereas the village rule of Ban Ho concentrated more on environmental aspects. It regulated the natural resource use by defining the protected forest areas, banning the use of explosive agents in fishing, banning hunting of certain rare animals, prohibiting selling of land within the community area, prohibiting activities that may cause forest fire, and by limiting the allowable number of trees cut to two per *rai*. In Ban Pang Hin Fon, the whole village rule was titled as “Rule for forest protection”. It was approved by the tambon council, the head of the Watershed Management Unit, the head of the Care Mae Chaem Organisation, and the district chief of Mae Chaem, and it took effect in 1996. Apart from the upland villages, also the lowland villages of Mae Chaem, including Ban Lau, had village rules.

As an example, the village rule in Ban Pang Hin Fon read as follows:

1. Cutting of trees:
    - Tree cutting in conservation forest is prohibited. Outsiders are not allowed to cut any trees in the village area. Fine: 500–1,000 Baht.

- Only the villagers are allowed to cut trees in the community forest, and only when necessary. The villagers are not allowed to sell any timber. The sanction is a 100–500 Baht fine and confiscation of the felled trees.
- It is allowed to cut and sell trees from the planted areas that are in the villager's own land but cutting needs to be registered. The village committee and watershed management officials must receive a report on how many and what kind of trees are cut and when.

2. The fine for causing forest fire is 500 Baht per *rai* of forest. Those farmers who want to burn their fields must make a firebreak. If fire spreads, the fine is 500 Baht/*rai*.
3. The villagers are not allowed to expand their fields. The fine is 500 Baht/*rai*, and cleared land is confiscated by the village. In addition, the violator of this rule must plant trees on the cleared area.
4. Hunting is prohibited. Fine for outsiders is 500–1,000 Baht depending on type and size of the animal. For villagers the fine is 1,000 Baht.
5. Fishing in streams and public ponds is prohibited. Fine 500 Baht.
6. Outsiders are not allowed to buy any piece of land in this village. Officers of the village are not allowed to sell land to outsiders. Land that has been sold is confiscated by the village and reforested.
7. Every household of the village has to participate in village activities. Each household is required to send at least one representative, particularly to the village meetings and to village development and forest protection activities. If a household sends no representative, it has to pay 50 Baht per activity. At the village meeting, representatives must be in time, 30 minutes before the meeting starts. Meetings take place at least once a month. If a representative is prevented from attending, a letter addressed to the village committee and the headman needs to be sent.

Village rules were prepared according to slightly different procedures varying from village to village. Commonly, the villagers first had a meeting for discussion, and, thereafter, according to what was decided, the rules were written down. In Ban Lau, for example, three groups were involved in the process: village consultants, who were such knowledgeable persons as Buddhist monks and elder persons, the village committee, and the villagers. After writing down the rule in the village, it was often sent to officials for confirmation. After signing, it was returned back to the village. This was typically only a formality but probably for officials also a means of control. For the villagers, official confirmation gave security and provided a way to show their efforts to follow the government conservation goals. A copy of a comprehensive version was kept in the district office, and an abridged version was often written on a village notice board (as was the example rule shown above), so that all villagers could see it.

The communities prepared the village rules in principle by themselves, but outsiders, such as the Care and Queen Sirikit projects, could help them in the process. The Care was involved in defining rules that concerned natural resource management. It also encouraged communication between the villages on this issue. From the Care point of view, the focus was on environmental protection although sustainable harvesting was also encouraged. Furthermore, the villagers were advised to check and, when necessary, revise their rule once a year. The motivation for the villagers to prepare these rules lied largely in the will to show to officials that they were capable of managing their own forests. This was viewed as a means to avoid the extension of a strictly protected area to the village territory.

Enforcement of the rules appeared to be primarily villagers, in particular village committee, responsibility, or that of certain persons appointed by the village committee. The villagers of Ban Yang San, however, wished even more government involvement in controlling and particularly in punishing the outsiders who violated the village rules. Sanctions were in the form of fines, which were normally used for repairing possible damages to the environment and the inconvenience caused to other villagers. If a person was too poor to pay fines, the villagers gathered together to discuss the matter. In the traditional system, which was still used, for example, in Ban Ho, the sanctions for violating the rules of a protected forest area were social. That may have meant, for example, that the villagers refused to help the person in question or to attend a funeral that took place in the household. Enforcement of the rules

within communities was regarded as easy because of the small size of villages and good organisation (village leader and committee in control).

Village committees also had other tasks in forest management apart from organising meetings for defining village rules and for enforcing the rules; they were the central bodies for forest management activities in the villages. They usually organised fire control activities and building of check-dams. In general, the committee called a village meeting, in which usually one member per household attended, to solve any type of a problem.

The national logging ban on natural forests had actually rather little impact of the village level. The villagers were largely unaware of it, and the effects had been mainly indirect, although not insignificant. Withdrawal of the logging concessions, enlargement of conservation areas, and intensified efforts to stop slash-and-burn cultivation were for the villagers among the most notable effects of the logging ban as was, more generally, the transition of forest policy from production emphasis towards conservation.

Fire prevention as a crucial activity in forest management

Fire is likely to occur naturally in the seasonally dry tropical forests in the hills of northern Thailand. Human activities have increased the extent and frequency of fires which have become an annual hazard and a threat to ecosystems. Fire causes damages to the mature forest, the ground flora, the soil seed bank, and to tree seedlings and saplings, and, consequently, prevents forest regeneration. When young trees are unable to reach maturity and old trees die, the result is a sparse canopy, a poorly developed understorey, and encroachment of fire-resistant grasses. If fire damages occur continuously, degraded grassland takes over the forest. In areas frequently burned, the diversity and the density of trees and the diversity of the ground flora tend to be reduced. (Elliott 2001, 158). Furthermore, loss of soil fertility is regarded as a threat caused by large-scale fires (Nalampoon 2003, 302, 305). In the uplands, the risk of high-intensity fire is apparent; at mid and high altitudes, fire may behave unpredictably because of the steep slopes and climatic conditions (Makarabhirom et al. 2002, 11).

Human activities are the major cause of forest fires. Peter Hoare (2004, 38) suggested, based on his study in Nan Province, Northern Thailand, that the two main reasons why fires occurred were burning for hunting and clearing of land for agriculture. These can be regarded as the most significant causes at the study site as well: Firstly, fire was still used as an agricultural tool in the remaining slash-and-burn systems and it can also be used in permanent fields; and secondly, fire was used in hunting to chase the game out from the forest or to attract to fresh grass (Elliott 2001, 158). Fire started by the hunters usually occurs in remote upland areas, and those hunters tend, according to Hoare, to be outside the social control of local communities. In agricultural burning, uncontrolled fires are a major hazard. Controlled burning has traditionally taken place in Karen and Lawa fields, and as a result of training also other groups have adopted more efficient ways of fire control. (Hoare 2004).

Fire has been an important tool in many other ways as well. One of the central uses has been burning to provide fresh grass to cattle; especially *Imperata cylindrica* grass lands have been burned for grazing land (Hoare 2004, 37). In addition, burning was widely believed to stimulate the growth of edible mushrooms such as *hed poa* (*Astraeus hygrometricus*). This has, however, no scientific evidence – on the contrary, fungal mycelia are likely to be damaged in burned-over areas (Juprachakorn 1990 and Kamsathorn 1990 in Elliott 2001). Apart from these causes of fire apparent in the study area, villagers may use fire to improve the leaf growth of certain plant species, such as *pak waan* (*Melientha suavis*); to facilitate the growth of bamboos; to promote seed germination of such species as teak (*Tectona grandis*); to eradicate pests or diseases; or to promote the growth of grasses that can be used for brooms and thatched roofs (Makarabhirom et al. 2002). Moreover, other causes than those related to rural livelihood also appear, and fire may start, for instance, from a cigarette or

campfire. Furthermore, people may even deliberately start fires because of ethnic tensions caused by rivalry over land.

The Thai government defines forest fire as a fire on forest land "that occurs for any reason and in the absence of any control" (RFD 1996 in Rakyutidharm 2002, 112). The RFD has estimated that as many as 99% of the forest fires occur because of human activities. However, the RFD has inadequate manpower to control these human causes and, actually, its attempts for strict control are likely to increase the tension between forest officials and forest dwellers. (Hoare 2004, 40).

Each year in Thailand considerable areas burn during the dry season: for example, in 2000 the burned area was 197,000 ha in total (FAO 2001). Increased fire damages were reported in 2003 as compared to the previous year, and it was suggested that insufficient penalties could be blamed for this increase (RECOFTC 2004a). The RFD has strengthened its efforts in fire prevention and established forest fire control centres in critical areas. It has actively campaigned to intensify fire prevention and to include communities in fire management programmes by extension campaigns. (Makarabhirom et al. 2002; Nalampoon 2003, 308). These interventions may have had an effect on people's attitudes, and as Pearmsak Makarabhirom et al. (2002) suggest, people have become increasingly aware of the risks of their own fire use. However, the view of the government that the forest dwellers are the principal cause of fires probably has also had an effect on local people's thinking.

Fire management in the villages

Communities were expected to help the government in planting trees and making firebreaks. At first, the RFD could assist the communities financially in these activities, and villagers were hired to prepare firebreaks. When the activity was well established, the villagers took over, and usually the watershed networks started to organise the work on their own although the RFD Watershed Unit could help by providing lunches. In the villages, typically one person from each household participated in making a firebreak. It was prepared by cutting trees on the hill so as to clear a line 10–15 m wide that would stop the fire. The firebreak was made on the top of a hill. When possible, existing primary forest on the hilltop was preserved and a firebreak was made in the vicinity of such forest. The village committee organised the preparation of firebreaks and informed people about the risks of using fire and how those risks could be avoided. Extinguishing of the fire was usually the responsibility of the upland villagers themselves although the RFD could provide help.

Traditionally, in the communities fire was prevented by digging firebreaks around buildings, and backfires were used to stop the advance of fire (Makarabhirom et al. 2002). Fire management was usually practised in the traditional systems of slash-and-burn cultivation. The Karen had firebreaks in their traditional forest management system. Burning in Karen fields took place in April, and before that the villagers carefully and with strict observance of taboos prepared firebreaks around the settlement and the fields (Trakansuphakon 2001, 118). Controlling of the fire in a slash-and-burn cultivation system was important because proper regeneration of the fallows was necessary. In July, the Karen used to have a ceremony to apologise to nature that they needed to burn the fields (Trakansuphakon 2001, 119). The Hmong, however, seemed to lack the tradition of firebreaks that the Karen had (cf. Tomforde 2003, 358).

Other means of local fire management have included the use of early fires to burn the dry debris and thereby to diminish the intensity of fire in the late dry season (Rakyutidharm 2002). As mentioned above, grazing the cattle had a similar effect by reducing the amount of combustible material on the ground. Makarabhirom et al. (2002, 11) argue that the "abandonment of rotational shifting cultivation practices also makes fire management more difficult". This argument is based on the assumption that changes in land use result in abandoning of traditional fire management (apparently referring to the practices of the Karen and Lawa) that could have helped in preventing intense fires. Land use change also affects

through tenure insecurity: lack of tenure rights hinders community control of fire and makes it difficult for communities to control outsiders by rules and regulations. Furthermore, fire has also social effects by causing crop failure, drought, and difficulties in earning a livelihood, which may further disintegrate the social structure.

To prevent the fire from spreading into the village, a forest belt was often left around it as a buffer zone (Fig. 12). A healthy moist forest could at least delay the progress of fire and give more time to stop it. The villagers actively cooperated in making firebreaks, in fire watching and in fire extinguishing in the current fire management system that presumed that the local people play the main role in the implementing activities. Watershed networks also organised joint activities, and, for example, the villages cooperated in making firebreaks, which were prepared for each village one at a time in a rotational system. If the coverage of firebreaks in villages was considered as sufficient, no common firebreak for the whole watershed was required. Apart from the joint activities, the farmers individually made firebreaks around the field they intended to burn.

Figure 12. The forest surrounding Ban Ho village as a 500-m wide zone was protected in order to prevent fire from spreading to the village. (Photograph: Minna Hares).

In Ban Ho, which was a village with relatively healthy forest around it and had fires rather as a problem of the past, references to fire management as forest management activity were made less frequently than in the other upland villages studied. In Mae Ya Noi, the forest was also in good condition, but due to the national park, the government was more actively involved in fire management. On the other hand, in Ban Lau only a few people (older than 50 years of age) expressed concern of forest fires. Fire management seemed not to be a priority issue even if the adjacent hill sides had regularly experienced burning. In general, fire management was actively carried out, which was indicated in several responses, and presumably because of these activities, forest fire was usually regarded as no concern. In general, almost all interviewees mentioned fire management as an activity taking place in the forest indicating that it was the most important single management practice the local people were involved in. Thus, it seemed that the government's fire control programmes had succeeded well. The

villagers were motivated and welcomed even more assistance for fire management activities. Firebreaks surrounded the villages and were maintained regularly.

In the public discussion, fire prevention had been used as a justification to oppose the Community Forest Bill because it was claimed to sustain conditions suitable for forest fires by allowing people to reside adjacent to protected areas. A claim often presented in the literature states that communities have skills for fire management based on their traditions, but because of the insecure rights to land and natural resources, they lack motivation to use their skills, and, moreover, the loss of traditional knowledge makes them eventually unable to control fires unless they are retrained. (Makarabhirom et al. 2002; Rakyutidharm 2002)

Reforestation projects

Reforestation was a management practice, principally organised from outside the communities although villagers were used as labour force. The primary task of the RFD Watershed Unit in Pang Hin Fon was, apart from managing the watershed, reforestation. The tasks of the unit included tree planting, weeding and fire control. In addition to planting, the villagers were involved in plantation maintenance in such tasks as weeding and watering. The RFD and its Watershed Management Office had organised tree planting in each of the villages studied. Moreover, the Care had carried out reforestation activities in Mae Chaem District, in Karen, Lawa and Thai villages. Every year on the King's and the Queen's birthdays (5 Dec. and 12 Aug. respectively) a tree planting event was organised for the villagers; it was announced in the radio, the RFD provided the seedlings needed, and all the villagers who were capable took part in planting. Trees were planted near the villages. For example, in Mae Ya Noi and Ban Ho planting took place along the road. In Ban Ho this was actually the only organised reforestation activity. Furthermore, the schools in Ban Lau and Ban Pang Hin Fon sometimes carried out reforestation in the adjacent watershed area.

Other reforestation activities in which the villagers were involved in apart from planting of trees included weeding, watering of seedlings, and monitoring. The villagers had participated in reforestation of former swidden areas and opium poppy fields; they had been involved in the reforestation of severely degraded hillsides in the watersheds. Both men and women seemed to participate in tree planting projects. In compensation for planting they were paid a salary in the Queen Sirikit Project and in some of the RFD reforestation schemes. Other reforestation initiatives were also implemented, particularly in the Doi Inthanon National Park and other conserved areas. Within these projects, however, local labour was often paid no salary but, instead, only lunch was provided. The villagers could participate in the government reforestation activities also outside their village. The RFD had a tree nursery in Ban Pang Hin Fon from where seedlings were provided reforestation efforts also for the purposes of communities or households. As a policy for encouraging tree planting in the villages, the villagers could collect these seedlings for free.

Species that were planted in the reforestation projects were rather poorly known in the villages; often the villagers could not recognise the tree species they planted. In addition, opinions of the villagers differed even in determining whether the planted species were local or introduced to the village area (and new to its forest stands). Species were suggested as introduced when the villagers had not seen them in the surrounding area. In general, a common view among the interviewees was that reforestation should be carried out with local species. However, one interviewee in Ban Phui had a view that it makes no difference whether the tree species are local or introduced because they anyway enhance the state of the environment. Species mentioned by the villagers included eucalyptus, pine, and bamboo, for example.

Reforestation in the Queen Sirikit Project aimed at imitating the natural forest and, therefore, several species could be planted in the same area. Local pine (*Pinus kesiya*) was planted because it grows fast. In addition, some twenty other species were planted. The Royal Project, which was more active in other parts of the Mae Chaem District, had a component for

training people in planting trees on their own land. People involved in the project had a choice among tree species for different purposes: construction, production of fruits, and for handicrafts. The species had been selected on the basis of local knowledge. This project, however, was not implemented in the villages studied.

Reforestation from the villager viewpoint

According to the Watershed Management Office authority (Watershed Management Unit 2002, pers. comm.), eucalyptus (the interviewee did not specify the species) was planted in the 1980s in Mae Chaem, on a relatively small area, but that activity had discontinued. The reason for selecting eucalyptus in the first place was that it was a fast-growing type of tree. Local pine (*Pinus kesiya*) was another fast-growing tree that had been planted in the uplands of Mae Chaem and Chomthong. The suitability of these species was, however, questioned in the villages; it was commonly viewed that trees were generally good for the environment, excluding pine and eucalyptus. Their use in reforestation was criticised particularly in Ban Yang San, Ban Pang Hin Fon and Ban Phui where these species were planted near the villages.

Eucalyptus was mentioned to cause draught in the area because it produces much litter and its leaves are waxy, decomposing slowly, just as the pine needles, which prevents water from soaking into the soil and, consequently, water flows straight to the river. One informant told that he had heard of experiences in other provinces in which eucalyptus was planted near the river with the result that the water level had decreased. A group of women stated that this had happened also in their village: the smallest streams had dried up after planting eucalyptus and pine and even a slight decrease in the river water could be noticed. In Ban Pang Hin Fon, a respondent was of the opinion that eucalyptus was unsuitable for that region because of its drying effect, lowering the ground water table. Moreover, no markets for eucalyptus existed. Planting of eucalyptus in Ban Phui was, according to the village deputy headman, stopped because eucalyptus is not resistant to winds and the shade they provide is inadequate.

Another species that was regarded as unsuitable for sites where it does not grow naturally was pine. In Ban Pang Hin Fon, a respondent indicated that pine that was planted in reforestation projects grew poorly in that area. More severe accusations were also expressed. Pine was blamed for drying up the environment. In Mae Ya Noi, it was complained that pine plantations lack those species occurring in the tropical evergreen forest[39] that surrounds the village. Because of the request of the villagers, the RFD had replaced pine by other local species.

Pine and eucalyptus were also planted in Ban Yang San with unsatisfactory results from the villagers' point of view. They had observed that the undergrowth in a plantation was scarce, which resulted in disappearance of wild animals because they were unable to forage. Thus, eventually this would lead to a barren ecosystem. Furthermore, pine was viewed as decreasing the amount of water if planted adjacent to a water source. This was noted also in other villages. Pines were said to suck the fertility and water from the ground, which could be observed as a decreased flow of water in streams and rivers. Moreover, pine forests burn regularly and burning in them is fast, which was considered a hazard for the surrounding environment, and for fire control effective firebreaks were needed. In natural pine forests burning was no problem because they were mostly situated on the tops of the mountains and covered a limited area only. Alternative management options for the existing pine plantations in the watersheds are obviously needed (Kiianmaa 2005).

Trees have often been planted in straight rows although it is regarded as eyesore in the landscape. The reason for this, according to an officer of the Watershed Management Unit (2002, pers. comm.), was the scarcity of resources. The villagers of Ban Yang San stated,

[39] According to the RFD forest type classification (e.g. RFD 2001); cf. classification of Maxwell and Elliott according to which this refers to almost ever-wet evergreen forest (Maxwell & Elliott 2001, 15).

moreover, that those straight rows fail to provide adequate hiding places for animals, which had therefore moved somewhere else.

As described above, the villagers expressed discontent with the types of trees used for reforestation. Nevertheless, also satisfaction with the selected species was expressed. In Ban Lau, the villagers indicated that they had negotiated with the RFD and received the kinds of species they had asked for. The RFD, though, continued to plant pine and eucalyptus on the tops of the mountains because of their ability to grow fast and because they were used to test the reforestation techniques. The RFD had, however, decreased the planting of pine and eucalyptus. Furthermore, an initiative had been taken to mix pines with other species, typically up to eight species were interplanted. Field officers of the RFD claimed that the species planted were suitable for the area and the purpose was to plant various species at one particular site so as to make the forest natural-like. It was hoped that the native species, of which fast-growing ones were favoured, promoted biodiversity. Another reason to replace pine and eucalyptus with native species was the villagers' wishes. At the time of the study, the RFD had started a project in two villages (Sedusá and Mae Hae Tai, which were visited), on an initiative from the villagers, with the aim to provide the villagers with such useful trees for planting as fruit trees.

A group interview of men in Ban Yang San implied that all the decisions of planted species were made by the RFD officials and that, in general, the villagers were unaware whether the trees were native or introduced and what of effects they had on the environment. A group of women in Ban Yang San, on the other hand, held the view that they had observed the environmental effects of different tree species on surface waters and could see their capacity to maintain the water balance by looking at a cut in the tree trunk, which in the case of pine and eucalyptus lacks water. Consequently, they claimed that they would recognise the species suitable for planting.

In addition to reforestation, natural forest regeneration was promoted by preventing fire and protecting the area from destructive uses. Together with reforestation, planting of fruit trees on farms was encouraged by the projects. Training was often included in these projects, but some villagers, in Ban Phui and Ban Pang Hin Fon, complained that they had received no training but only been given the seedlings to plant.

Training and education given within the framework of reforestation projects were aimed at motivating the villagers and raising their awareness of the importance of the forest. As a result, several interviewees suggested reforestation as a solution for deforested or severely degraded areas, and as a tool for environmental protection. One respondent suggested that trees could be planted in free spaces and another one that with more funding more buffer zones could be planted. However, not everyone was convinced of the necessity of tree planting in the forest, particularly in those villages that still had the forest in good condition. One reason for these doubts was that the forest has a capability to regenerate naturally. Another problem seemed to be the disagreement regarding the species to be planted. Even more important as a factor affecting people’s motivation was the wish to receive a better compensation for reforestation efforts. Reforestation decreases the area of land available for agriculture and, in some cases, the availability of non-timber forest products, and, moreover, fails to provide a permanent source of income for the villagers. It seemed that reforested land was of little use for the villagers. Sometimes, edible herbs, both native ones and cultivated ones that had spread or were remnants from fields, could be gathered. Hence the motivation of the villagers to participate in government-promoted reforestation efforts seemed much weaker than that in fire management.

The main result of reforestation, as the villagers expressed it, was improvement of the environment. Conservation aspects and the rehabilitation of severely degraded areas were noted, as well as the function of trees and healthy forest in preventing forest fires. It was believed that with an improved state of environment the water availability would also improve – and this was most probably the main reasoning used to motivate the villagers to plant trees. For example in Ban Lau, the village headman told that they had had more water in the village

since “palm trees” (as he called them) were planted in the hills of Doi Inthanon. The respondents’ views of the benefits of tree planting can be described as environmental, economic, and aesthetic, of which the environmental benefits were emphasised most of all. Some people suggested that even more trees could be planted. On the other hand, some elder people, who apparently had not participated in project training, could see no solution for deforested areas.

In general, perhaps the most problematic aspect, however, from the villagers’ point of view, was reforestation of farming sites, opium poppy fields and fallows of the rotational cultivation system, thus limiting the agricultural area. However, this had taken place on a large scale already quite some time ago when the government took active measures to eradicate the opium poppy and to halt the rotational and shifting cultivation. However, those living in adjacent villages were allowed to gather non-timber forest products from the reforested areas in accordance with the rules set by the Watershed Networks.

6. FIELD RESULTS ON LOCAL CONCEPTIONS OF THE FOREST AND ITS MANAGEMENT

6.1 General considerations

This chapter is based on the fieldwork carried out in the six rural villages selected for detailed study. The results illustrate conceptions of the local people living in or adjacent to protected forests related to the meaning of the forests and to practices and objectives of forest management. Firstly, an examination was made on what types of changes people had observed in their environment and how deforestation appeared in the area. Secondly, the significance of the forest and views of conservation were analysed. Conservation, however, was understood somewhat differently in the villages and in the forest administration, and this caused some tension also at the local level. Thirdly, the chapter, therefore, focuses on emerging conflicts. Fourthly, the last section illustrates the sources of environmental information, for better understanding of the background that affects the way people perceive their environment. In addition to the conceptions of the villagers, the views of the pupils in Rajpacha boarding school in Mae Chaem were used as material.

6.2 Environmental changes in the area studied

In general, deforestation was no longer at the time of the study regarded as a problem in the study area. The majority of the respondents expressed an opinion that the diminishing of the forest area had come to a halt in their surroundings. About one fourth of the interviewees expressed an opinion that, basically, no significant changes had taken place in the surrounding environment. This was a common view, for instance in Ban Ho, because, as explained above, the forest still remained in this village. Furthermore, 28% of the interviewees, particularly in those villages that had long traditions of forest conservation, saw currently no environmental concerns. Although they had to emphasise their achievements in conservation to convince the government that their residence in the area would be possible also in the future, they seemed to base these opinions also on their own observations.

Many interviewees, however, indicated that deforestation used to be a problem in the past; enlargement or stability of the forest area was currently observed as often as deforestation. Anyhow, people seemed to be very well aware of the consequences of forest loss. Despite the generally quite optimistic view of the state of the environment today, several people (68% of 57) indicated that environmental concerns existed, usually referring to concerns related to forest and water resources. The main problems the interviewees felt as a consequence from deforestation were related to water, microclimate and livelihood.

Changes of the forest area and increase in conservation

A major environmental change indicated in the interviews was the change in the state and area of the forest. Generally, the interviewees regarded that deforestation had occurred in the past but at present it was kept under control due to rules and regulations. The conserved forest area had increased because logging was banned (and controlled both by the villagers and officials), the expansion of farms was limited, and preventive actions on forest fire had intensified. Nevertheless, it was commonly regarded that the forest had become degraded except in Mae Ya Noi and Ban Ho. An indication of degradation that was most often mentioned was that trees in the forest were smaller and younger than in the past. Some interviewees had observed that certain tree species had become rarer and, in particular, teak was mentioned. Only two (23 and 31-year-olds) were of the opinion that the forest area had remained the same. (Table 13)

Various views of changes in forest area appeared among the interviewees depending on their residence and point of view. All opinions were represented: it had enlarged or diminished, or no change had taken place. It seemed, however, apparent that often the perception of

decrease or increase in the forest area depended largely on the time frame: very recently the forest area had increased. The highest proportion of the interviewees considered that the forest now covers a larger area than in the past. This was viewed primarily as a result of stricter rules on conserved areas and also of fire prevention and reforestation. On the other hand, more than one third of the interviewees held the view that the forest area had decreased. The number of interviewees who were of the opinion that the forest had become degraded was larger than the number of people suggesting that its condition had improved. It was particularly mentioned that now small trees were dominant while large trees had almost disappeared from the landscape. Some people regarded that the state of the forest had improved but deforestation still existed. This variety of views that was found also within villages reflected the impact of individual features in environmental literacy.

Table 13. Views on changes in forest area and condition by village as indicated in household interviews. (It should be noted that the response of one interviewee may included in two classes; for example, indicating that the forest area had increased but the forest was degraded, or vice versa).

Change observed	*Number of interviewees*						
	Total (60 interviews)	Ban Lau (12*)	Ban Yang San (10)	Ban PHF** (9)	Ban Ho (10)	Mae Ya Noi (13)	Ban Phui (6)
Deterioration of state of forest							
Forest area had decreased	22	8	7	3	1	1	2
Forest environment had degraded [1)]	15	5	4	4	1	0	1
No (recent) changes in forest							
Forest area had remained the same	2	0	1	1	0	0	0
No deforestation (or degradation)	5	1	0	2	0	2	0
Improvement in the state of the forest							
Forest area had increased [2)]	25	2	2	5	5	8	3
Condition of forest had improved [3)]	7	0	1	2	1	3	0

1) Trees were viewed to be smaller than in the past, and certain tree species had become rare and the availability of forest products diminished.
2) Including responses indicating that the number of trees had increased.
3) Trees had grown and were larger than in the past
* The number of household interviews in the village
** Ban Pang Hin Fon

A difference between villages appeared (Table 13): in Ban Lau and Ban Yang San, only two villagers stated that the forest area had increased whereas in other villages (in the close vicinity of the national parks of Mae Tho and Doi Inthanon) half or more of the interviewees viewed that the forest area had enlarged. In Ban Yang San and Ban Lau, a decrease in the forest cover and also degradation had been observed. These two villages had experienced commercial logging, especially in their teak forests, before the 1980s when the tambon Pang Hin Fon area was still rather inaccessible. The difference between the forests in the two tambons was observable, with denser and less degraded forests in Pang Hin Fon. On the other hand, in Ban Pang Hin Fon and Ban Phui the hills had been taken to agriculture already a long time ago and now the change that could be observed was reforestation of former fields on mountain tops. In the Hmong villages that used to grow opium poppy, the highest lands

tended to be under cultivation, whereas forests were found in valleys, but the situation had more or less reversed.

Increase in the protected forest area, in addition to the agricultural transition, was the major change in land use in the study area. This was noted particularly in Ban Ho and Ban Yang San, which were among the last villages within the area studied in which swiddening was practiced. Conservation area had enlarged mainly to the swidden lands that were left fallow. Larger area than before was said to be protected due to tightened regulations, which indicates that traditionally totally conserved forest area tended to be smaller than the area that the communities were currently expected to preserve.

Reforestation of former rotational farming areas left as fallow had, moreover, affected the composition of the forest. When rotational farming was practiced, forests around the villages were at various successional stages and people could utilise forest products from forests of different ages. Where people had permanent fields and conserved forest, the forest stand was more homogeneous in age and structure.

Other environmental changes

In addition to changes in the forest area, other changes had also taken place in the environment. Again, contrasting opinions appeared. Contradictory views occurred, for instance, regarding water conditions: More often people viewed that water supplies had decreased, but a few were of the opinion that water availability had improved. A men's group in Ban Yang San held the view that fluctuation of the rains tended to be greater than in the past and that this could be linked to decreased soil moisture, because in permanent fields the soil has to be tilled. Concerning ecological changes, apart from those in water supplies, another major alteration was a decrease in the number and diversity of wild animals. This was observed particularly by villagers of Ban Lau and Ban Yang San, in which disappearance of forest was most often reported, but also in Mae Ya Noi, where an old woman explained how they used to eat the meat of wild animals in the past and how several birds and other animals had disappeared.

Other than ecological changes in the surrounding environment were sometimes reported. A built environment had replaced the natural one and infrastructure had improved; the road and communications network had developed and settled areas expanded. Even materials for houses had changed, noticed a young man in Mae Ya Noi: leaf roofs had been replaced by tin roofs – to save work and because suitable leaves had become difficult to find. These other changes may, moreover, have indirect environmental effects, such as the improved infrastructure causing an increased pressure on land and forest resources as described earlier. Furthermore, population growth had, for example, increased the need for water. People needed water not only for own consumption but also for irrigation and, consequently, water shortage had become an increasingly severe problem. Explanations and solutions to this problem were also sought nationally, but some villagers had their own views. The village headman of Ban Yang San, for example, suggested that the pressure on water resources is caused, on the one hand, by a heavy use of ground water in the lowlands and, on the other hand, by planting of pine trees which take up much water.

In Ban Ho and Mae Ya Noi, the interviewees, although a minority of them in the latter, were most unlikely to report any major environmental changes in their surroundings. In Mae Ya Noi case, those who had seen no significant changes in the environment were less than forty years of age. This implies that since the establishment of the national park, the state of the environment had either improved or no significant changes had taken place. On the contrary, in Ban Yang San and Ban Phui all interviewees considered that their environment had faced changes. Many of those who had observed no alterations referred specifically to the forest environment and looked at the issue only from the forest point of view.

Villagers of Ban Ho and Ban Pang Hin Fon seemed to have the least environmental concerns, whereas those of Ban Lau and Ban Phui commonly expressed a concern. Scarcity of water in the dry season and the decrease in precipitation worried many people in other villages in addition to Ban Pang Hin Fon. Another concern expressed were forest fires which, however, seemed now to be quite effectively prevented and controlled and, therefore, more often regarded as more serious concerns in the past than today.

Other issues raised included lack of cooperation and knowledge, increased pressure on forest and land resources, and the establishment of national parks that had resulted in lack of agricultural land, scarcity of forest products, and a threat of relocation of the community. The fear of relocation concerned primarily the people of Ban Ho, but to some extent also people of Mae Ya Noi who still feared relocation after having lived for several years within the national park. The pressure on land resources appeared to be a specific concern in Ban Yang San, which probably had already experienced a long history of competition for land and other natural resources, not least for the teak forests that formerly surrounded the village. Illegal logging was a matter of concern for some people in Ban Phui. Moreover, future concerns expressed also included infrastructure, population growth and material development.

To sum up, much had changed in the environment and livelihood during the previous couple of decades. The more active role of the government in the uplands concerning ethnic minorities seemed to be the primary force of change. However, population growth, particularly through migration and the globalisation of markets had also played their role in this transition of rural livelihood and environment.

Views on current and former reasons for deforestation

To understand the villagers' perceptions of forest management and conservation one has to first look at how they viewed deforestation. The way the concept of deforestation was basically used seemed to include the cutting of trees, but sometimes cutting of shrubs and branches could also been referred to. It seemed that those who lived in villages still surrounded by dense forest were stricter in their definition. This was also reflected in the views on whether burning is deforestation. It appeared that some lowland Thais excluded burning from the definition of deforestation.

The villagers' views on the immediate reasons for forest loss were basically similar to those that have been discussed in the earlier chapters. Consistent with the official view, agriculture was regarded as the main factor causing deforestation both in the past and still today (Fig. 13). The traditional slash-and-burn farming was, in particular, blamed for deforestation. This may, however, indicate the success of the government campaign to stop slash-and-burn cultivation. It was often told that in the past rotational swiddening destroyed the forests, but as a result of fewer people practising that type of agriculture, the number of trees had increased. Men seemed to mention this more often than women, perhaps indicating that they participated more often in the training schemes of the government. Thus, it can be speculated that the men had more often than the women been objects of government campaigns.

Not only traditional swiddening but also current farming practices were regarded as major reasons for deforestation. The expansion of farming land was viewed to be a result of landlessness, economic reasons, and the population growth that was suspected to cause a problem in the future as well. One significant reason for the increased pressure to clear new areas for cultivation was the abandonment of field rotation, which had increased the need for cash for fertilisers and agricultural chemicals. Farming land had expanded also because people wanted to increase their income. One woman from Ban Pang Hin Fon suggested that especially cabbage growing had caused deforestation. Some interviewees also referred to opium poppy growing as having led to deforestation in the past. In addition, inheritance was viewed as a problem when the agricultural land area was fixed and could not be expanded; a Lawa man, for example, explained: "If a father has ten *rai* to be divided among four children after his death, 2.5 *rai* will not be enough for each child to feed a family".

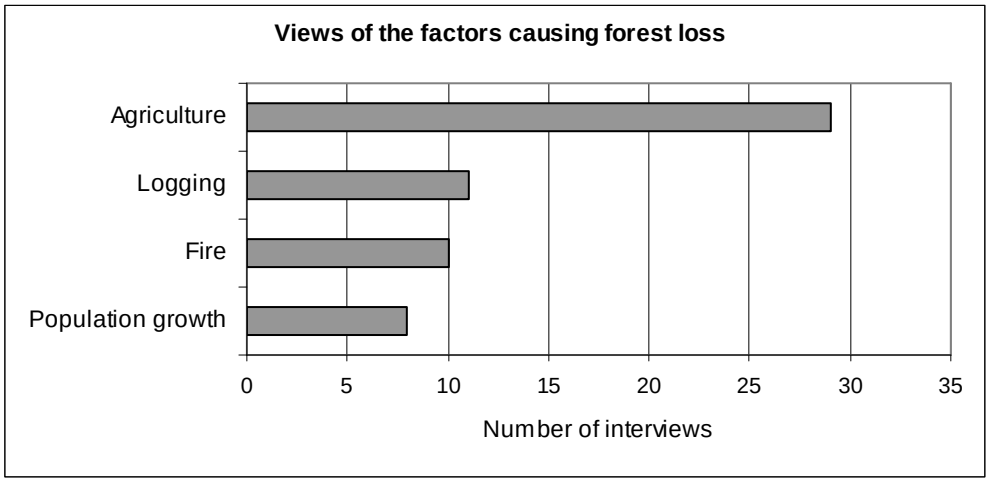

Figure 13. Reasons for deforestation indicated in household interviews (total 60).

Some respondents mentioned that previously logging used to cause deforestation. One of them was the village headman in Ban Yang San who described the changes in the environment caused by commercial logging by using the adjacent hillside as an example. He told that it used to be teak forest, but presently it grew bamboo and other pioneer species. The reason was contract logging. Other people in Ban Yang San stated that the wealthy lowland people had logged all the forests, particularly those growing teak. (Nevertheless, it is worth noting that the translated English word teak could have also been used for other species than just *Tectona grandis*). A men's group in Ban Yang San was of the opinion that logging in the past, short-term exploitation of the forests, accepted by the government, launched a process that still affects the environment, and the problems today can be traced to the past.

Despite the fact that logging concessions were cancelled after the logging ban, the interviewees implied that some logging in the surroundings of the villages still occurred. This, however, referred primarily to cutting for household construction purposes, but also illegal logging in conservation area was mentioned. Certainly, however, logging for own construction purposes could also be regarded as illegal, depending on the viewpoint, but as villages had their own rules that allowed cutting from the community forest within certain limitations, it is unlikely that illegal logging would have referred to this. A Lawa man, for instance, stated that it is the greedy people who log good wood from the forest. Illegal logging could, though, take place for agricultural purposes. In Ban Phui, three respondents reported that illegal logging took place in the conserved forest, and they suspected that possibly the loggers were their co-villagers who wanted to expand their farms regardless of the rules. In the adjacent village Ban Pang Hin Fon, on the other hand, one interviewee suggested that it was outsiders who illegally logged in the area. Typically, the people who cleared forest were referred to just as "some people" and were left without further description, but sometimes attributes like greedy, selfish or ignorant were used.

The fact that logging was seldom mentioned does not necessarily indicate that it was considered insignificant or much less a sign of lacking environmental literacy. For one thing, commercial logging in all natural forests had been banned already more than ten years back at the time of the study. Illegal logging for selling timber was presently uncommon and not regarded as a problem. The vicinity of two national parks, furthermore, made the officials to pay specific attention to the area. Secondly, illegal logging by locals is difficult to study and it

was not a focus of this research. Furthermore, a strong motivation existed to control illegal logging by outsiders in the village territory. This was not only because of the villagers' need to defend their rights but also because they feared that they would have been the ones first accused at any occurrence of illegal logging and because of their willingness to prove good management skills. Communities, thus, tried to control the loggers from the outside and from within the village, but it was often felt, anyhow, that this was an overwhelming task for the villagers, and help from the government officials would have been needed.

Quite a few people referred to fire as such as a cause of deforestation in consideration of its likelihood. This may have been because of successful fire management. Fire was, however, commonly regarded as a threat to the forests. It was typically associated with agriculture, and, therefore, regarded as having been a greater threat in the past than today because at present active fire prevention efforts took place in the villages. Burning was viewed as a problem of the past when effective firebreaks were lacking. Burning and forest fires were most often mentioned by the villagers of Ban Yang San, who presumably had seen the effects in their own surroundings.

Population growth was mentioned as a reason for deforestation, mainly because of the subsequent need for agricultural land. Furthermore, population growth was suggested to result in clearing of the forest also because of building of settlements. Infrastructure development was referred to by one respondent who thought that the forest had changed after a road was built.

Other reasons for forest loss were mentioned more occasionally. Reasons seldom referred to as causing deforestation and degradation included the lack of demarcation of boundaries in forest areas. For example, two villagers of Ban Yang San stated that deforestation occurred in the past because they lacked a clear separation between conservation and utility forest, and agricultural land. Decentralisation was also referred to in one interview as a possible cause for deforestation: an interviewee from Ban Phui was worried that some villagers may take advantage of the government decentralisation policy to cut trees. A solution this interviewee suggested was that the RFD should perhaps control the whole forest area. Moreover, the lack of control and rules was viewed as a threat to forests, particularly in Mae Ya Noi. However, also, for example, in Ban Phui a respondent implied that a failure to obey the government rules may pose a threat to the forests. On the other hand, he at the same time blamed the government for destroying the forests in spite of its tight rules. Migration to the uplands was also mentioned once.

Some concerns of disregard of the state of the forest were expressed. Furthermore, a few interviewees, particularly men, were concerned of villagers' insufficient knowledge of the benefits of the forest and its conservation. A young woman from Ban Lau expressed this concisely: "Some people just do not understand" referring to conservation of the forest. Moreover, some respondents felt that lack of cooperation and participation of the villagers in conservation activities posed a threat to the forests.

Effects of deforestation as perceived by villagers

Despite the fact that deforestation was commonly regarded more a problem of the past than today, people seemed to be familiar with the effects of deforestation. However, in Mae Ya Noi, inside Doi Inthanon National Park, about two thirds of the interviewees expressed that they had seen no deforestation and, thus, were unable to describe its impacts. Some villagers could not even think of such a situation when no forest would be around. Otherwise, the most important effect of deforestation that people suggested was shortage of water. Local effects on climate were often mentioned: Apart from reduced precipitation, increased temperatures were commonly suggested effects of deforestation. Another usual response was that deforestation would make life harder (Fig. 14). Only two interviewees replied that they did not know the effects of deforestation, which could as well mean, for example, that they were tired to answer the questions.

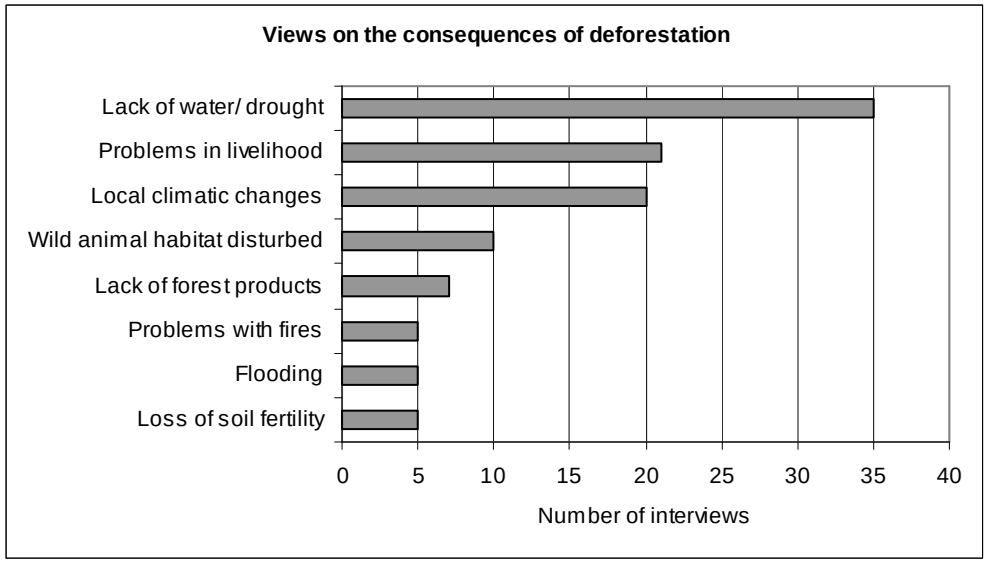

Figure 14. Villagers' views on the consequences of deforestation shown as frequencies in which they were mentioned in household interviews (total 60).

Disturbances in water balance were mentioned by almost half of the interviewees. Most of them emphasised the impact of deforestation on water availability. Some people specified that water scarcity was observable in surface waters as a diminished flow in rivers and brooks. For example, in Ban Ho an interviewee explained that because the water level in a nearby stream had slightly decreased, they had considered it important to conserve the source of water. Furthermore, drought (referring to the lack of water during dry season) was viewed as an effect caused by deforestation. One interviewee referred to the lack of water in agriculture by saying that the income of farmers would suffer when they were unable to grow anything due to drought.

Some interviewees, moreover, noted that deforestation may cause flooding of rivers during the rainy season. One Thai man explained the process as follows: "Forest loss leads to flooding because there are no more trees to absorb the water. Flooding will cause loosing of fertile land." A men's group in Ban Yang San also brought up flooding as a consequence from cutting trees. They stated that at the time when opium poppy was cultivated flooding occurred because of greater runoff but now the situation had improved because that area had a tree cover. An increase in the runoff, they said, also reduces the water resources because water flows quickly straight to the river.

In conservation projects, the water availability seemed to be the central reasoning used to motivate the villagers to participate. For example, in Ban Pang Hin Fon, the Hmong women in a group interview explained that the Thai officials had told them that the forest is important because of water (and the good weather conditions it creates). Therefore, it can be suspected that some of the responses emphasising the significance of the forest in ensuring the water availability were a result of conservation campaigns. On the other hand, further questions often revealed that people based their views on the connection between forest and water on their own observations, such as flows in streams and rivers, as mentioned earlier. For instance, a group of Lawa women had observed that the water flow had decreased in a stream nearby when trees were cut but increased again after planting trees. They explained this by the ability of shade and leaves to preserve moisture in the soil. A Hmong group had noted that the soil is moist under large trees but dry if trees are small or non-existent.

The Karen had a view that certain trees are able to preserve water resources. Thus, they had planted those trees near water sources, whereas planting of pines in the watersheds was against their traditions. The Lawa also believed in the capacity of certain tree species to retain water. The village headman stated that the forest gives water because, as he had observed, trees keep moisture, and another Lawa interviewee explained that tree roots contain water (which was a view also expressed by a group of Thai women in Ban Lau), and when a tree is cut, the water comes out. Nevertheless, some people (for example the two other men present at the interview of the village headman in Ban Ho) were uncertain whether any connection between trees and water availability existed, and some interviewees expressed clearly that the forest caused no increase in rains. The forest was, however, thought to increase the air humidity. Some interviewees also mentioned the effect of trees on soil moisture. A group of Karen men suspected that the soil loses more of its moisture in permanent than in rotational fields. Rotational farming was usually not regarded as a threat to water availability. One Karen even argued that water was more abundant at the time when rotational farming was practised than now.

Increased air temperature was an often-mentioned impact of loosing the forest. A young Hmong woman noted, moreover, that deforestation causes greater fluctuation of temperatures: it not only makes the weather hotter in the hot season but also colder in the cool season. Furthermore, one interviewee from Ban Pang Hin Fon (where cool winds often prevailed) suggested that it would be windier without the forest.

More than one third of the interviewees indicated that living would become more difficult if the forests were logged. One Karen man described this in a poetic manner: “[The forest] means my life: One tree can mean one human life. If you hurt a tree, you hurt yourself. Deforestation is like a wound, you have to go hospital and it takes a long time to recover.” A Hmong man explained the same thing in practical terms by saying that living would be difficult without the forest which provides forest products, such as firewood and bamboo shoots. Lack of food and construction wood were also mentioned among the impacts of deforestation on everyday life.

Other effects of deforestation and forest degradation in people’s views included the loss of wild animals. For instance, wild pigs and deer were mentioned by one Karen man who stated that those had already disappeared from the area of Ban Yang San due to deforestation. Another perceived impact of deforestation was that fires were noted to occur more frequently in areas where the forest had been cleared, and that fire had more devastating effects in a degraded forest. For example, a Lawa man explained that the forest with large trees is more resistant to fire, whereas small trees burn more easily. In addition, some interviewees stated that deforestation causes problems with land because the soil erodes and cracks when it dries and loses its fertility. Extensive expanding of farming land, explained a Karen women’s group, causes problems with soil. On the other hand, it was also implied that people would use the opportunity and expand their fields if the forest was logged.

In some cases, it seemed that what the villagers were told about the consequences of deforestation was contradictory to their own experiences. A few interviewees indicated that despite the fact that the condition of the forest had improved and its area enlarged, scarcity of water still existed and also temperatures had become higher. When asked for explanation, they were unable to clarify the reason for this. One explanation would simply be that those are natural characteristics of the area, but in interpretation also the possibility exists that the villagers just told what they had been taught about forest loss instead of expressing their own understanding. On the other hand, deforestation is a complex process as stressed earlier, and defining its causes and effects is always difficult.

Deforestation was sometimes regarded as also having other than just environmental effects. One Karen man suggested that deforestation affects people’s mood and they would be grumpier if no forest was around. Another Karen man said that if all the forests were lost, no forest would be left to the next generation. In addition, a Hmong interviewee held the view that people would fall ill more easily if the forest had vanished.

Conceptions of school pupils on consequences of forest loss

Results from the Rajpacha boarding school on perceived consequences of deforestation were parallel with those from the village interviews: scarcity of water and alterations in water balance were the most common effects mentioned. Impacts on weather and the survival of the living things, humans and animals, also appeared frequently in responses. Girls more often than boys pointed out scarcity of water, whereas boys stressed the increase in air temperature. Related to water balance, also the occurrence of floods was often listed as a consequence of deforestation. On the other hand, four students mentioned that the forest would dry up in the case of forest loss. A student group in *matayom* 3 also noted that fires would occur more easily in deforested area. One student wrote that deforestation would cause landslides. Altogether, in 23 responses (62%) the lack of water was referred to as a consequence. Many of those who did not mention water scarcity referred to the inability of people to live in a deforested place.

Change in climate towards higher temperatures as a consequence of deforestation was referred to in 30% of the responses. Three of the students suggested that the whole world would become hotter, but it was unclear whether it only referred to their own surroundings or to global warming. In two responses, dry climate was mentioned as a cause of forest disappearance, and one female student group of *matayom* 5 suggested that the air would be polluted, which would affect people.

The third aspect that was expressed, in addition to the issues of water and climate, was the survival of people and animals. Commonly, animals were explained to become homeless and all living things unable to survive without the forest. One girl was of the opinion that we could survive but only uncomfortably. Some students answered that we would have no place to live. One opinion was that the whole world would die. In total, half of the pupils referred to the survival of the living and to the forest as a place to live in.

Other impacts that were mentioned included effects on products and productivity of the land: the lack of food and other necessities such as medicines, the lack of water for agriculture and the loss of soil fertility. In addition, some students mentioned environmental effects such as the loss of the ecological balance and a decrease of natural resources. One girl wrote that the next generation would not see the forest if deforestation continued. One respondent expected much trouble as a result from deforestation, and another stated that “it would be very quiet and lonely and thus not a cheerful place to live in”.

Responses often straightforwardly described the immediate reasons for deforestation, but some efforts to explain cause and effect also appeared. For example, a group of boys in *matayom* 5 suggested that the world would become hotter as a consequence of forest loss because the ozone layer would be destroyed. They further explained that it would cause drought and a desert would be created. It seemed that pupils were taught about the ozone layer at school but their knowledge was incomplete. Explanations of cause and effect were, however, usually related to the sphere of everyday knowledge. Some students explained that the survival is threatened because of lack of water; one stated that drought is a result of hot weather; and another noted that dryness of the climate is a reason why fires occur more frequently. A group in *matayom* 3 remarked that we would lack food because we would be unable to produce it. Deeper knowledge was obvious in a response of a girl from *matayom* 5 who explained that deforestation causes floods because the soil is incapable to absorb water.

Reviewing of local people’s conceptions of the reasons and consequences of deforestation and their views about changes in their environment gives background information to examine their motivation for conservation or sustainable forest management in general. The next section brings more light to this issue by examining the significance and uses of the forest.

6.3 Significance of the forest to the local people

It was evident that the villagers recognised the significance of the forest in many ways. The abstract idea of valuing the forest in itself was expressed only indirectly; instead, the value of the forest was phrased through its products and services. A practical view was that the forest was necessary for the livelihood in the rural uplands, and deforestation would force people to move to urban areas and work as wage labour. No significant differences between villages or ethnic groups could be noticed in descriptions of the meaning of the forest. The government had had some campaigns that tried to increase the awareness of the importance of the forest. However, the villagers generally regarded them as unnecessary as they basically repeated existing views, although it was acknowledged that some individuals could need also this type of education.

What is a good forest like?

The villagers' ideas of how a healthy forest looks like can simply be summed up by saying that it is comprised of many trees. This was a view that appeared in each village. Most likely this included both the number and the variety of trees. Further descriptions were also given, and in Ban Ho and Mae Ya Noi a good forest was characterised as a stand with large trees. Other common characteristics given for a good forest included abundance of water, in the form of streams, for instance, and provision a pleasant weather. It was, moreover, emphasised, especially in Ban Pang Hin Fon, that a good forest is also a habitat of many wild animals. In addition, some interviewees described a healthy forest as green and beautiful. Or as a Hmong saying goes, the good forest is a black forest because it has many large and healthy trees with dark green leaves, which makes the forest look black. Furthermore, one Karen man in Ban Pang Hin Fon pointed out the ability of a healthy forest to regenerate naturally. In general, the interviewees more often described a good or healthy forest by its looks and also by the services it provided rather than by its products. In fact, only one response mentioned forest products, fruits.

In Ban Ho, one villager equalled a good forest with the fallow phase forest in a swidden cycle. This view seemed, however, to be an exception although the conservation forest was surprisingly seldom used as an example of the healthy forest. This indicated that many of those areas were preserved only recently and also perhaps the fact that the strict rules in those forests had to some extent excluded them from the villagers' daily life. People in Ban Ho and Mae Ya Noi indicated that in the surroundings of their villages they could find healthy forest. In Ban Pang Hin Fon and Ban Phui, a good forest was thought to be found in an adjacent area. At the same time, however, it was implied that the state of that forest could be better, although the forest was described as having improved due to fire prevention and conservation.

Describing the meaning of the forest

The villagers interviewed were practically unanimous in the view that they could not manage without the forest. The main reason given was the scarcity of water, for consumption and agriculture (43% of the interviewees). In each village, people remarked on the significance of the forest as a provider of non-timber forest products (29%), in particular food, medicinal herbs, and wood. Local climatic conditions were also presented as a reason why forest was important for people living in these villages (24%). The productivity of agricultural land was in some interviews indicated as a reason why the forest was important for the livelihood of the villagers, implying that soil erosion was a minor problem in people's view, while the drought in the dry season was the main limiting factor in agriculture. In total, only four interviewees stated that it would be possible to live without the forest although it would be hard. All four were Hmong men who were relatively well educated and had a better income than the average of households studied.

When people were asked what the forest meant to them, the answers were many. However, some themes common to each village and emerging throughout the interviews were easily detectable. As in the case of justifications for what would make the livelihood threatened in a deforested environment, also here the importance of water was particularly emphasised. Cool and fresh air and forest products were also central in defining the meaning of the forest. The significance for survival in general was quite a common response – for example, "[The forest is] a place that makes our life better so that we live better" – whereas the meaning of the forest as a natural resource that benefits humans was pointed out a few times only, and mainly among the Thai in Ban Lau. Four women stressed the beauty of the forest and, moreover, the village headman of Mae Ya Noi suggested that the forest is also important because it can make the village famous and attract tourists.

Some villagers told that they never go to the forest. However, they at the same time highlighted the significance of the forest because of its services such as water. Furthermore, they gathered firewood but for that they had no need to go to the forest.

Views of schools pupils on the significance of the forest

At Rajpacha boarding school, the pupils' answers (which totalled 37) included 44 different aspects on the significance of the forest. Similarly with the view of the villagers, provision of fresh air was named as an important function of the forest. Among the pupils, this was actually the most common single response to the question what the forest means to you; the significance of the forest for weather or air was referred to in 14 responses (38%). Aspects such as the warmth the forest provides, balanced temperatures, and, in three responses, the oxygen that the forest produces were also mentioned. One group of *matayom* 3, furthermore, added that the forest absorbs carbon dioxide and decreases the air pollution indicating what they had learned at school.

The question about the meaning of the forest asked at the school (which was visited without an interpreter) was often understood or translated as a definition of the forest, although it was about the significance of the forest. Commonly, the forest was described as nature and in some cases defined as consisting of trees and other plants. Two respondents in *matayom* 5 noted that the forest can also be man-made. A girl at the same grade responded that "the forest is the nature that exists together with humans".

The usefulness of the forest was often pointed out (in 35% of the responses), seemingly more often by boys than by girls. However, only in three answers it was concretised what kinds of products can be obtained from the forest (building materials, for instance, for construction of houses and furniture). Another central function was the forest as a place to live in (35%); one boy, for example, wrote that "the forest is like home where you can get warmth and freshness". Most often the place to live in referred to people but sometimes also to animals and other living things. The forest was defined as a place "full of living things". Six responses emphasised the importance of the forest for life and survival implying that without forest the respondents or even the whole world could not survive. One girl stated similarly to some villagers that life without forest would be uncomfortable

Unlike answers given in the villages, provision of water was not given priority among the most important functions of the forest, although it was regarded as relevant: it was mentioned in seven responses (19%), and three of them were from the large groups of *matayom* 3 who answered the questions as homework and possibly received some guidance. The difference as compared to the villagers' views seems to reflect the situation of these pupils staying at school instead of village and having little experience on farming yet, despite the fact that they mainly came from upland farmer families. By and large, similarities to the villagers' views were, however, predominant. Some conceptions of water appeared on both sides. For instance, the conception that the forest makes rain was expressed also in the pupils' responses. In addition, a group in *matayom* 3 responded that the forest protects from floods and landslides and maintains the soil fertility.

Aesthetic values, the forest as a beautiful landscape, were suggested seven times (19%), interestingly, more often in the boys' responses. Other non-material values mentioned (each in one response only) included happiness and healthiness, which were stated to be promoted by the forest, and educational values in the sense that the forest was said to provide information about useful resources. In contrast to the non-material values, one boy had a clearly economic view about the forest as a tourist attraction. In general, however, tourism seemed to be a rather distant issue for the rural people of the area despite the vicinity to the Doi Inthanon National Park, which attracted numerous tourists who also visited some ethnic minority villages by the main roads.

"If you stay in the forest, you must preserve it"

As an example of views regarding the significance of the forest for the villagers, a Karen woman's view is presented below. She is not selected to represent an average villager or interviewee in a statistical sense, and this specific case is not aimed to be presented as the most representative one but just to demonstrate one, typical case. Furthermore, it must be kept in mind that the purpose of the present study was by no means to measure the individual's level of environmental literacy (by using scientific or any other standards) but just to clarify people's conceptions and their relationship to the forest in accordance with the idea of adaptive management. The following Karen woman's case was published by Hares et al. (2006).

"*A 40-year-old Karen woman, referred to here as Ms J., whose main occupation was farming and who had no formal education, knew her environment well. She was a migrant from the neighboring Mae Hong Son province but had already lived in the village for 17 years. She had moved to the village to get married, and her husband was actively working to develop the village and promote environmental conservation. As the other villagers, Ms J. [had] stopped rotational slash-and-burn cultivation about 10 years ago. Moreover, despite health problems, she had participated in reforestation activities arranged both by governmental and non-governmental organizations. In addition, she had planted elephant grass to prevent soil erosion on slopes adjacent to the village.*

The forest was very important to Ms J., and she stated that people in the village could not live without it. To her, the natural forest was a habitat for many wild animals, such as tigers that kill oxen and gibbons; she added, however, that many wild animals no longer existed in the surrounding area. The importance of the forest was indicated in religious rituals as well. Ms J., as many other villagers, sacrificed to the spirit of the origin of water, which was believed to be very holy and powerful. Buddhist ceremonies were performed in the forest as well; one important ritual in upper watersheds and other areas where forest protection is regarded as particularly significant was to ordain a tree as a monk. Thus, religious traditions played an important role in the village, and that probably had an effect on environmental literacy as well. For example, some villagers believed that the spirit of the mountain, who was angry for some reason, caused the exceptionally severe floods in 2002.

Ms J. regarded deforestation as still a problem in the village area because the cultivated area was expanding. She explained that one reason for this is the need for money for fertilizers, which now have to be used because fields are smaller than before, and no field rotation can be practiced owing to stricter rules of forest protection. She added that if the area were left unburned, trees could grow, but the lowlanders burned the hillsides near the village. A common reason for burning was a species of mushroom, which was believed to be found only if the area was burned. Ms J. explained that the water level decreases when the forest is burned. As a consequence, wild fowl, for example, are now less common because fire destroys their eggs, which they lay in winter when the humidity is suitable. The main problem with burning, however, was seen to be the decreasing availability of water. People faced a problem: They needed to use agricultural chemicals in their fields if burning was forbidden. In

sum, Ms J's opinion was that 'if you stay in the forest, you must preserve it'". (Hares et al. 2006, 140)

6.4 Collection and use of forest products

In the past, the forest used to play a more significant role than at present in providing non-timber forest products. Wood for fuel and construction, food, fodder and medicines used to be the most important forest products. These were still important for the villagers (Fig. 15) although substitutive commodities were increasingly available. Most of the interviewees gathered some forest products, and construction wood was still obtained from the forest. Altogether, 47 different forest products were mentioned in the sixty household and six group interviews, and only two interviewees gathered nothing from the forest, both of them from Ban Lau (Table 14). Underreporting of forest products[40] was likely, but even so the results indicated that – despite strict conservation regulations, forest degradation, and replacement of some forest products, for instance, with synthetic produces – forest products were still significant for these upland dwellers.

One example of underreporting was firewood (Fig. 15), which the interviewees sometimes excluded from the list of forest products although practically every household collected it. One reason perhaps was that it was taken for granted and therefore not mentioned. Another reason was that firewood could be found from the immediate surroundings of the village and perhaps also from severely degraded areas no longer defined as forest. Moreover, people often perceived only non-wood products as forest products, while construction wood and firewood were classified in a way that could be named as forest resources. When asked about the use of the forest, the interviewees usually told about the use of wood, whereas when asked about forest products, wood was often excluded. The interpreter also had some effect on how the interviewees understood these questions.

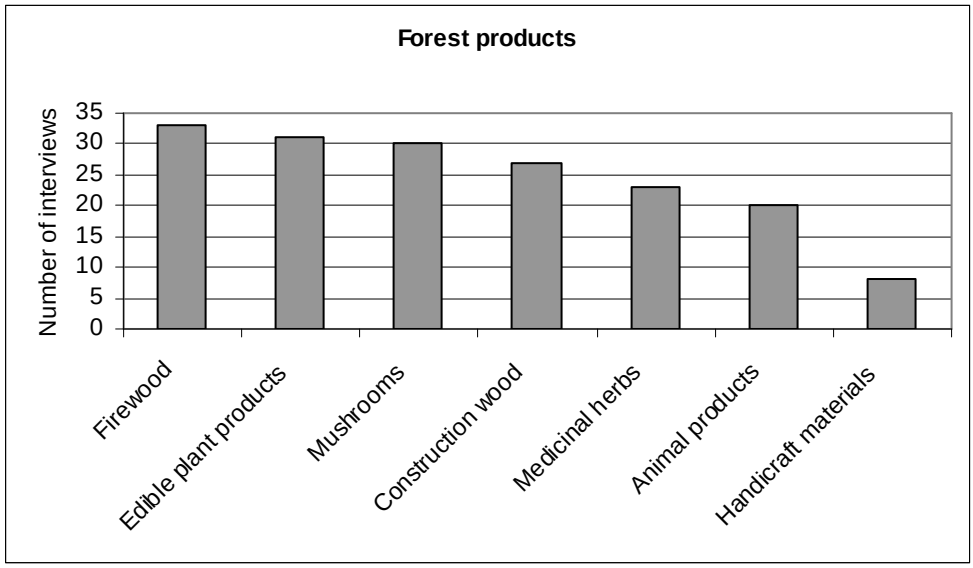

Figure 15. Collected forest products shown as frequencies in which they were mentioned in household interviews (60) and in those six group interviews in which the theme was discussed (one count per interview recorded).

[40] To avoid this, a more systematic study specifically on forest products would have been needed. Moreover, the definition of forest products was blurred; for example, sometimes planted crops gathered from fallows were included and wild plants gathered within the village excluded.

Table 14. Products gathered from the forest (shown with +) by village as indicated in household (n=60) and group interviews (7) showing also the purpose of gathering (for own use @; local exchange ~; or selling $).

FOREST PRODUCTS	*Total*	*Ban Lau*	*Ban Yang San*	*Ban PHF**	*Ban Ho*	*Mae Ya Noi*	*Ban Phui*
Construction material							
wood for construction @	27	+	+	+	+	+	+
other (e.g. bamboo)	6	+	+	+			
Firewood @	34	+	+	+	+	+	+
Herbs (medicinal) @	23	+	+	+	+	+	+
Food							
mushrooms @ $ ~	30	+	+	+	+	+	+
bamboo shoots @ $	26	+	+	+	+	+	
fruits @ $	10	+	+	+		+	+
vegetables[1] @ ~	12	+		+	+		+
edible leaves @ ~	7	+	+	+	+		+
sprouts	1						+
roots	1						+
edible flowers @	1		+				
banana flowers @	1					+	
banana leaves	1		+				
banana shoots @	1			+			
nuts @	3		+			+	
seeds @	1					+	
Handicrafts & other plant pr.							
dye	2				+		+
rattan @	1			+			
bamboo for handicrafts	2		+	+			
raw material for handicrafts	1					+	
wood for furniture	1					+	
plant for washing hair	1		+				
ferns @	1		+				
orchids for decoration & herb	1			+			
Fodder	1						+
Animals & animal products							
game	5	+	+		+		
deer @	1		+				
wild pigs @	1			+			
birds @	3			+	+	+	
rats @	1		+				
fish ~ @	5		+		+		+
crab	4				+		+
shells	2				+		
frogs @	4		+		+		+
bamboo worms @	3		+				
ant larvae @	4	+					
worms @	1		+				
fighting beetles @	2		+				
bugs $	1		+				
honey @	2			+			
butterflies to watch	1			+			
Other products							
water @	2				+		
salt ~	1		+				
Nothing	2	+					

[1] may also include edible leaves

* Ban Pang Hin Fon

Forest products were collected mainly for own use although sometimes bamboo shoots, mushrooms and some fruits gathered from the forest were sold when abundant. Otherwise selling of non-timber forest products was uncommon and took place basically only in Ban Lau and Ban Yang San. Access to markets, restrictions set by the conservation rules and the availability of forest products affected the possibilities to earn extra income by selling forest products. In addition, barter of forest products between the villagers was usually reported. Sometimes, mushrooms, vegetables, such as edible leaves, and fish were exchanged at Ban Yang San and Ban Ho, for instance, for rice, and in Ban Ho the surplus in forest products was sometimes given to another villager for free. In addition to rice, chilli and salt were reported as products for local exchange. However, one interviewee explained that only drug addicts barter forest products to obtain drugs.

Wood and reeds for construction and fuel

The most important single product obtained from the forest was firewood. Wood was the main source of fuel in the villages studied; only a few people used gas. Use of gas in addition to wood was more common in Ban Lau and Ban Pang Hin Fon than in other villages. For example, in Mae Ya Noi only one household in the village used gas for cooking, the others were dependent on wood as a fuel. In Ban Pang Hin Fon and Ban Phui, some households also used electricity as a source of energy. It was produced by water power and available only when the water flow was sufficient. Therefore, wood remained important also for those households. One interviewee in Mae Ya Noi argued that if they had electricity, their need to cut trees for firewood would be reduced.

Construction wood was another important product people obtained from the forest as the houses were largely made of wood. The need for construction material was one of the main reasons why people emphasised the significance of a community forest although, for instance, in Ban Yang San, the community forest was mostly covered by bamboos and trees large enough for construction could be difficult to find. Bamboo was sometimes used as construction material but seldom as compared to wood. In the past, bamboo was used for tying in construction because no nails were available. Some respondents also mentioned the large leaves (of *Dipterocarpus tuberculatus*) that were used for roofing. Leaf roofs had, however, become rare, a dying tradition. Instead, tin roofs dominated despite the fact that leaf roofs are much more pleasant: cooler in the hot season and warmer in the cool season. The difficulty is that leaf roofs need to be repaired and changed often (every two years), and today a problem is also the unavailability of suitable leaves.

More than twenty tree species were used in the households according to the interviewees. Pines (*Pinus kesiya*, *P. merkusii*), for example, were among the most commonly utilised trees for construction material and firewood in the villages except for Ban Lau and Ban Yang San. However, one respondent in Ban Ho explained that these species were used because nothing else was left. In addition to pine, another popular species, according to the interviewees, seemed to be teak (*Tectona grandis*), particularly in Ban Lau, where villagers reported to have planted it. Teak was used to build houses although some respondents from Ban Lau and Ban Yang San told that it is not used as much today as some thirty years ago when teak trees still were abundant. In Ban Yang San, teak used to be more common in the past than today. Nevertheless, it seemed that sometimes interviewees or interpreters may have talked about teak although actually another tree species was in question. For example, teak leaves were explained to be used as roofing material although leaves of *Dipterocarpus tuberculatus* were the ones commonly used for that purpose.

Many other tree species (more than ten) apart from pines were mentioned to be used for construction; for example, *champee* and *champa* (*Michelia* spp.) were used in Ban Pang Hin Fon, Ban Ho and Mae Ya Noi. In addition, multipurpose trees such as *Spondias pinnata* were commonly used. Wood and bamboos were important as raw material not only in the upland villages but also in Ban Lau. In each village, several species were gathered for fuel as

deadwood. The interviewees in Ban Phui told that, in the past, trees were cut for firewood, but now they gathered wood from the rotational fields of the Karen when the fields were cleared for cultivation.

Environmental benefits of trees were particularly highlighted in Ban Ho and Ban Yang San when people were asked about the most important tree species in the forest. In these two villages the significance of certain species in maintaining the moisture in the forest was emphasised. Especially one long-living tree species was considered important for that reason in Ban Yang San.

As uses of trees were asked, the interviewees tended to categorise bamboos and bananas (*Musa* spp.) as trees. Several bamboo species were commonly used for various purposes in each village. One significant use of bamboo was for handicrafts, such as baskets. For instance, *mai bong* (*Bambusa tulda*) was used for binding and weaving. As mentioned, bamboos were also used in construction, although more commonly in the past. Bamboo species used for construction or handicrafts were usually different from those that provided edible products, such as bamboo shoots and bamboo worms (insect larvae living in bamboo). Trees also provided ingredients for cooking: for example young leaves of trees, such as *Melientha suavis* or *Spondias pinnata*, were collected for food.

Food and other useful products from the forest

Edible plants – shoots, leaves, fruits, flowers, seeds, roots – and mushrooms and medicinal herbs were significant products of the forest for the villagers. For dietary supplement mushrooms and bamboo shoots, in particular, were popular. For the villagers of Ban Lau, Ban Yang San and Ban Pang Hin Fon, these seemed to be more important than for the people in other villages, probably because of a better availability from the degraded forest. Vegetables, such as edible leaves, seemed to be especially important forest products in Ban Ho, presumably also because of good availability. However, in Mae Ya Noi, although the village was surrounded by a forest that was relatively well preserved, forest products other than firewood seemed to play a minor role in people's livelihood, probably because of the strict rules of the national park and because of engagement in cash crop cultivation in permanent fields.

The Hmong have had a tradition to domesticate medicinal herbs found from the forest for their homegardens. Herbs were planted in a common homegarden also in Mae Ya Noi. The significance of medicinal plants seemed, however, to have diminished because they have been, to some extent, replaced by commercial medicines and because people increasingly could afford to buy the commercial ones. The interviewees told that they had used medicinal herbs more when they had no access to health services, but even at the time of the study the access to health services in remote villages was limited. At least for minor ailments herbs were still often used. In Ban Lau, where access to health services was relatively good, and, moreover, the forest was largely degraded, less herbs were gathered than in the other villages. Furthermore, some interviewees in Mae Ya Noi stated that the knowledge of forest herbs was disappearing, which seems likely if their use was diminishing.

People also obtained raw material, such as bamboo, for handicrafts from the forest. In addition, women used dyes that they collected from the forest. Furthermore, the forest fauna provided supplement to the diet: for example, birds, wild pigs and deer were hunted although their availability had declined due to the hunting and degradation of habitats. Fishing, and catching crabs and shells was particularly important in Ban Ho. Frogs were also listed as forest products. In addition, bamboo worms and other edible insects as well as fighting beetles (e.g. for shows and public contests) were collected in Ban Yang San, and, particularly, the village elders of Ban Lau told about gathering of ant "eggs" (pupae) for food.

In Ban Ho, Lawa children from six to nine years old were interviewed in a group, and they told that with their mothers they had visited the depth of the forest where forest products are

usually gathered. The boys told that they went to the forest with a slingshot to catch birds, and the girls had gone fishing and gathering peppers with their mothers[41]. In addition, the children could name at least ten edible mushrooms to which their mother had introduced them. Their parents had also taught them how to collect from the forest edible plants and edible insects that were plenty and eaten, for instance, as fried. The children told that the girls go to the forest once a week but boys more often "because they are not scared".

The share of the forest products in the villagers' diet seemed, in general, pretty insignificant; one interviewee from Ban Lau responded that the edible forest products were "important but make a small share of the diet". On the other hand, two women from Ban Pang Hin Fon estimated that up to one third of their diet consists of forest products. Nevertheless, four people out of sixteen said that they use no forest products in cooking, and one Lawa woman from Ban Ho explained that only if she had nothing to eat, she went to the forest.

Views of school pupils about forest products

School pupils of Rajpacha school (grades *matayom* 5) in Mae Chaem listed 33 forest products and services in a total of 34 responses, when they were asked what products they obtain from the forest. The answers to this question were different from those of the villagers (although some difference may have occurred because of different translation of the question). The villagers told what they actually gather from the forest and use in their everyday lives, whereas the pupils gave more general answers and many of them seemed to lack personal experience of gathering and using forest products. Moreover, the products they mentioned were processed ones.

The pupils, both boys and girls, most often mentioned wood products. However, while in the villagers' responses firewood and construction wood were central forest products and only one interviewee mentioned wood for furniture, in the school the most often mentioned forest products were tables (in 41% of 34 responses) and chairs (35%). Meanwhile, none of the pupils mentioned firewood. Of the other forest products, paper was the third most often mentioned one (26%) in school responses. None of these three products most common in the answers were mentioned in the village interviews. Building of houses, though, was referred to almost as often as in the responses of the villagers.

Food was named as a forest product in eight responses, which was very few compared to the village interviews in which 79% of the interviewees told to gather some edible products from the forest. In addition, medicines, important for the villagers, and material for handicrafts were mentioned by the pupils only a few times. While the villagers' responses on forest products were centred on wood, fuel, medicines and food, some pupils viewed also the services of the forest as forest products. Fresh air was included in eight responses and clean water in four. One boys' group even mentioned oxygen as a forest product, and one girls' group answered that the forest prevents flooding. For five pupils the forest was a place to live in, and five pupils answered that the forest provides useful or beautiful things.

Forest products for all

No clear differences appeared between ethnic groups in the use of forest products although the Thai seemed to gather fewer species than the other ethnic groups, which could also be an indication of availability. The Karen, on the other hand, seemed to gather the widest variety of forest products. The interviews implied that the difference between the Karen and the Hmong in the use of forest products was minor, and residence was more decisive than the ethnic group although cultural differences occurred. Furthermore, means of livelihood affected the

[41] For example, young leaves of a species of vine were collected when available to be used like chilli because they had the same taste but were more stomach-friendly. The leaves were also used for medicinal purposes.

use of forest products. For example, in Ban Pang Hin Fon, the Hmong who were engaged in farming used to gather herbs and other forest products to a greater extent than did the Karen, who largely worked as wage labourers. All in all, however, the results implied that for any ethnic group living in the forested uplands the forest products were significant in everyday life. Those who were engaged in commercial agriculture and who lived in more accessible villages, seemed, in general, to be less dependent on forest products.

Some differences seemed to appear between villages in the variety of forest products gathered. Of the villages studied, the smallest variety of gathered forest products was reported in Ban Lau and Mae Ya Noi. This can be explained by the location of the village: in the case of Ban Lau, in a degraded area close to the district capital with good access to markets, and in the case of Mae Ya Noi, inside the national park. An explanation may also lie in the emphasis on commercial agriculture and deterioration of traditional uses of forest. The greatest variety of gathered forest products appeared in Ban Yang San, which could be regarded as a village keeping its traditions. On the other hand, also the Hmong in Ban Phui, with commercial agriculture as a main source of income, seemed to gather a relatively wide variety of forest products.

The interviews, furthermore, indicated that the level of income had no noticeable correlation with the use of forest products. On the other hand, the average annual income of the households included in the study was less than 33,000 Baht (about 800 US$), and the most commonly (in 85% of cases) income was below the poverty line for North Thailand (calculated as personal income of less than 828 Baht per month). This may also explain the lack of correlation within this research material. Moreover, the sample was too small for drawing any further conclusions on the impact of income or combined factors on the use of forest products. In addition, the lack of infrastructure, as exemplified by bad roads and difficult access to markets, and dependence on wood as energy source may have increased the significance of forest products for these rural people.

Differences between men and women related to gathering of forest products were also hardly noticeable in this material. The only marked differences were that men (about half of them) more often than women (about one third) included construction material in the products they obtained from the forest. This was apparently related to the distribution of work. Men (two thirds) also more often than the women (one third) mentioned mushrooms as a forest product perhaps because mushrooms were also marketed. Usually, no gender differences were indicated in the responses despite the distribution of work inside households, but the interviewees seemed to answer on behalf of the whole household. However, a tendency for men to be responsible of hunting seemed to appear. Moreover, no fundamental differences between age groups in gathering of forest products were evident in the interviews.

Changes in the availability of forest products

The availability of forest products had in general decreased in the villagers' view although at the same time the availability of some products had improved. On the other hand, several interviewees viewed that actually no clear changes in the occurrence of forest products had taken place. This was expressed by a few people in each village, but most often in Ban Pang Hin Fon, where the area surrounding had been under cultivation already for a long time. There a women's group stated that the area was unsuitable for finding edible (forest) products. Some respondents in Ban Lau noted that availability depends on the annual rainfall and thus varies from year to year.

It was indicated that in some degraded areas the availability of forest products was inadequate. A decrease in the number and variety of forest products was expressed in more than half of the interviews (in 60% of the questionnaires), and one fourth of the interviewees – including respondents from each village except for Ban Yang San – had observed a general decrease in all products. In addition, the villagers often specified which forest products had decreased. In particular, wild animals, including fish and other aquatic life, and also

mushrooms were claimed to have become less common. Interviewees in Ban Lau most often brought out this decreased availability. Even a decrease in bamboo shoots was noted by two interviewees indicating in the case of Mae Ya Noi an improved condition of the forest. Furthermore, herbs were stated to be harder to find. This problem was, however, alleviated in Mae Ya Noi by prohibiting other people than the villagers to collect herbs and by planting them in the village.

In Mae Ya Noi people also reported that firewood was harder to find than before. Probably this was because of the rules of the national park; one respondent explained that less firewood was available because no cutting of trees was allowed. A decrease in the availability of firewood was also noted in Ban Ho, where it had to be gathered from far away of the village and, consequently, the women's work load had increased. Firewood and other forest products, such as peppers, used to be gathered from fallows but now people usually had to go to the forest to collect them.

The reasons suggested for the decrease in forest products included deforestation and forest degradation. A women's group in Ban Yang San explained that some forest products had disappeared because large trees had been disturbed. Another explanation was that some forest products, such as rattan, had vanished because of fire. Moreover, a women's group in Ban Lau named hunting and deforestation as reasons for the disappearance of wild animals. On the other hand, in many places game was no longer hunted because of conservation. A few people named conservation as one reason for the worsened availability of forest products because certain mushrooms and also some vegetables were more difficult to find when no burning or logging took place in the forest.

The reason most often suggested for the decreased wildlife and forest products was population growth, which was mentioned in each village. Its effect on the availability of forest products was especially emphasised in Ban Phui and Ban Lau. Sometimes the interviewees indicated that actually the forest products had not decreased but gatherers were just more numerous. In addition to the increased number of people utilising forest products, also increasing needs were recognised. For example, one villager in Ban Ho stated that the forest resources were inadequate to satisfy people's greed. Furthermore, not only the number of people but also the increased number of domestic animals was in one response suggested to possibly be a reason for the declined number of forest products.

When rotational farming with long fallows was practised, young fallows attracted many wild animals and people used to hunt in them. One interviewee from Ban Yang San explained that this had caused a drop in the number of hunted animals, whereas now, when people work outside the village, they hunted less frequently. Over-hunting was referred to in some other responses as well, not only as a phenomenon of the past but as affecting the animal populations still today. Generally, the reason for decreased number of animals was unclear for many: an old Hmong woman from Mae Ya Noi, for example, described: "[The environment] has changed a lot: In the past, we got a lot of meat from hunted animals; there were a lot of birds, certain big birds which are the size of a duck, wild pigs, and animals that are a kind of rabbit. Also some deer and parrots lived here. I do not know why they have disappeared. Now, only some deer are left."

Despite the dominating view that forest products had become less abundant, ten interviewees were of the opinion that forest products had actually increased owing to forest conservation and improved fire management. This had been observed in Ban Ho, Mae Ya Noi and Ban Yang San. In Ban Yang San, in particular, the availability of bamboo shoots had improved but also bamboo worms, wild animals and herbs were mentioned. Moreover, in the northern part of Mae Chaem District, in the village of Huay Kiper, an informant reported that deer had returned to their forest by means of conservation.

On the other hand, although the availability of firewood had improved due to the increased number of trees, the villagers could only collect small-size wood, while before they burned large logs to maintain the fire all day, and particularly all night during the cold season. Now,

as the village headman of Mae Ya Noi explained, they used only small firewood and for cooking only. Heating in the cool season seemed to be a problem also in other upland villages.

Forest as a source of livelihood

Generally speaking, it became evident that gathering of non-timber forest products for selling could currently provide no sustainable source of additional income for the villagers. Only a few products, such as mushrooms, bamboo shoots or grass for sweeps, could be sold. In addition, selling of products from the conservation area would be technically illegal anyway. On the other hand, it seemed that substituting the products now gathered from the forest, especially food and firewood, with purchased ones could perhaps increase people's expenses considerably.

Forest products were seldom expected to become a new source of income for the villagers. Availability was clearly seen as a limiting factor but conservational aspects were also considered. The Karen stressed that the resources the forest provides must be primarily used for subsistence purposes; only certain non-timber forest products that are abundant, such as bamboo or some fruits, may be sold. Although commercial crops belonged essentially to the Hmong farming systems, some of them also emphasised the importance to use the forest only at need.

To sum up, the forest was regarded as important for the villagers and their livelihood because of its many products and services. Although the significance of the forest products had somewhat declined, they still provided an important source of fuel and construction wood and a supplement to diet. It could be concluded that although the conservation projects included training for increasing the awareness on the importance of the forest also to the local people, the villagers by their own experience were already convinced that co-existence with the forest is the best and the only way to survive in their mountainous environment. A Hmong woman in Ban Pang Hin Fon expressed that: "Some government officials have told about the significance of the forest and we agree".

6.5 Local means of conservation

The results of the fieldwork clearly indicated that in each village studied conservation of the forest was regarded as essential. Every interviewee considered forest conservation important – although means, motivations and objectives could differ. This section reviews the actions that the interviewees suggested for protecting the forest (summarised in Fig. 16). Control of forest fires was considered crucial for forest conservation. The interviewees also considered local cooperation, particularly within the communities, as important for conservation efforts. Cooperation with the government was also mentioned in some interviews, but the emphasis was evidently on local cooperation. Government involvement was, however, often referred to in fire management and reforestation. Although reforestation was commonly referred to as a conservation tool, it was regarded essentially as a government initiative. On the other hand, even if the division of land use into utility forest, protected forest and agricultural land was also a government initiative, it was generally appreciated as an effort to save the forest while also allocating land for farming. Restrictions on agriculture that were mentioned as a means of forest protection referred to threats caused by uncontrolled expansion of farming land. Rules, especially those set by the communities themselves, were in general viewed as necessary for conservation. Knowledge and education, often with the emphasis on the young, were also mentioned in some responses.

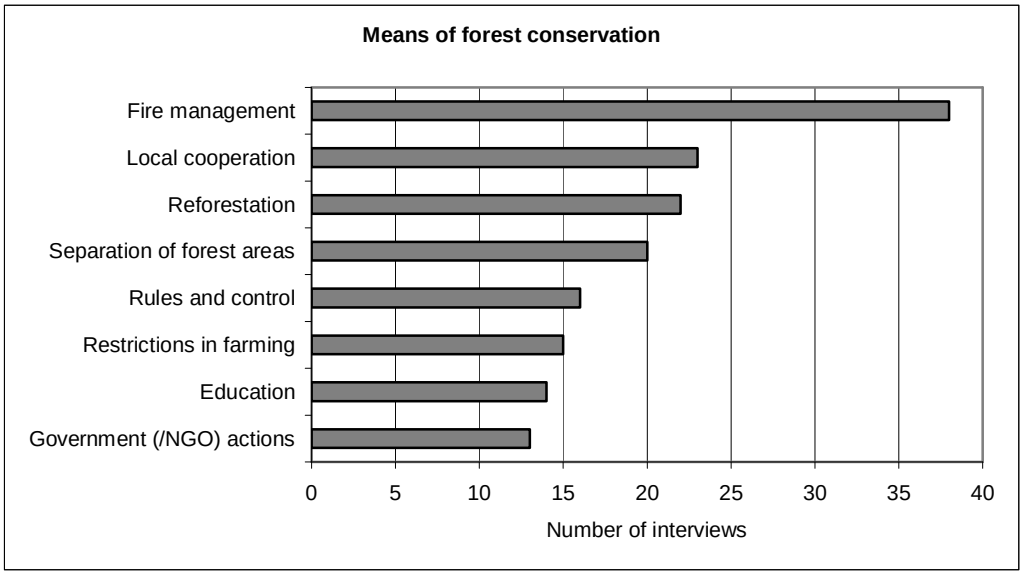

Figure 16. Views of villagers on means of forest conservation (household interviews, total 60). Separation of forest areas refers to demarcation of conservation and community forests and agricultural land. (The category of government actions includes responses implying cooperation with the government).

Traditions and religion in conservation

The Karen, Lawa and also the Thai traditionally protected the forests in watersheds and near the water sources, which were called the origins of water. Traditionally, a connection between the forest or trees and water balance was believed to a part of the harmony of nature although some doubts on this connection had appeared, possibly along with new information flows. In particular, the interviewees from Ban Ho and Ban Yang San stressed the significance of forest conservation in watersheds. In these villages, people still practised religious ceremonies to maintain the water resources and to conserve adjacent watershed areas. The villagers in Ban Yang San told that the origin of water is totally protected but, for instance, herbs could be gathered from that area. The villagers also protected areas surrounded by water, such as the land between river branches. The Lawa also regarded water, land and crossroads as significant in their rituals.

The Hmong lacked restrictions regarding the use of the land in watersheds. In the past, when slash-and-burn agriculture was still widely practised, the hilltops were cultivated because they were easier to burn and suitable for opium poppy. The Hmong used to grow poppy and were not traditionally protecting watershed forests. None of the interviewees in Mae Ya Noi or Ban Phui highlighted the role of watershed as a specific area to be protected.

Religion and traditions related to the forest still played a role in each village. They seemed to be particularly significant in Ban Yang San, where each of the interviewees mentioned religious rituals when asked about activities in the forest. However, bringing rotational swiddening to a halt had made the Karen to abandon many traditional rituals. Traditional rituals were still important also for the Lawa in Ban Ho. The Lawa had many taboos related to the forest, such as sacred trees, certain (four) days in a month when hunting was forbidden, and places of powerful spirits.

The Karen in Ban Yang San indicated that the purpose of certain ceremonies was to "prolong forest life", that is, to protect the forest. They described their rituals as related to the cycle of nature and promoting the harmony between people and nature. Furthermore, also two Hmong in Ban Pang Hin Fon expressed that their *Dong Seng* ceremony was performed to protect the forest. The village headman described that "*Dong Seng* is like a headman and has a duty to look after and protect the village". Furthermore, the Hmong protected large trees because they were thought to house the spirits.

The idea of conservation was, moreover, an incentive when the Buddhist ceremony of tree ordination was introduced. Although it had been recently introduced and was an initiative from outside, it had gained an established position in the villages of Ban Yang San, Ban Pang Hin Fon, Ban Ho and Ban Lau where it was performed. This was an indication that the villagers wanted to adhere to rituals. Some Karen, for example, practiced small-scale swiddening in upland fields so as to be able to continue performing traditional rituals that fundamentally belonged to the traditional farming system. Thus, traditions and rituals were regarded as important in co-existence with the surrounding forest.

Another factor apart from the halting of slash-and-burn cultivation that had reduced the practice of traditional rituals was the conversion of the villagers to Christianity. This was particularly the case in Ban Ho. On the one hand, the animists and Buddhists of the village followed the traditions related to swiddening through the rotation cycle as well as many other rituals related to the forest. The Christians of the village, on the other hand, had abandoned the traditional rituals labelled as pagan but had started new ones based on them: For example, instead of the traditional ritual performed on the river bank, the Christians of the village went there to pray together, and instead of offering to the spirits, they slaughtered a chicken or pig and had a meal together.

Sustaining the traditions related to the forest had encountered difficulties because of cultural and environmental changes but was still possible. Two interviewees in Ban Ho pointed out that the forest had been protected since ancient times: Already the ancestors set the rules of conservation and, therefore, people still have trees around after staying in their village for more than two hundred years. This was why the villagers agreed on the importance of protecting the forest. Furthermore, they held the view that as long as the rules of the ancestors are to be followed, no deforestation will occur. In sum, traditions still had a strong influence on people's thinking.

Tools and objectives of conservation

The means of conservation the interviewees suggested were basically similar in each village (Fig. 17.). The role of fire management in forest conservation was emphasised in each village. Local cooperation was also regarded as important in each village although it was less frequently highlighted in Mae Ya Noi, which probably had had fewer options for community activities than the other villages. Reforestation and other government involvement were often referred to as existing ways of conservation. Rules, control and restrictions in farming were less appreciated as means of protecting the forest among the Hmong than the Karen. Education was quite often mentioned, considering the fact that the villagers regarded themselves as being well aware of the significance of the forest.

Personal actions for forest protection included fire management, reforestation, ceremonies, education, and community cooperation, as well as projects from outside. Nevertheless, five women (from Ban Lau, Ban Ho and Ban Phui) responded that they themselves do nothing to protect the forest – although the two young Lawa women in this group referred to conservation projects and explained that their husbands had participated in them. In addition, two young women in Mae Ya Noi described conservation activities by their husbands instead of those of their own. Three interviewees in Ban Pang Hin Fon also associated conservation with projects implemented in the village and explained that no individual actions were carried out.

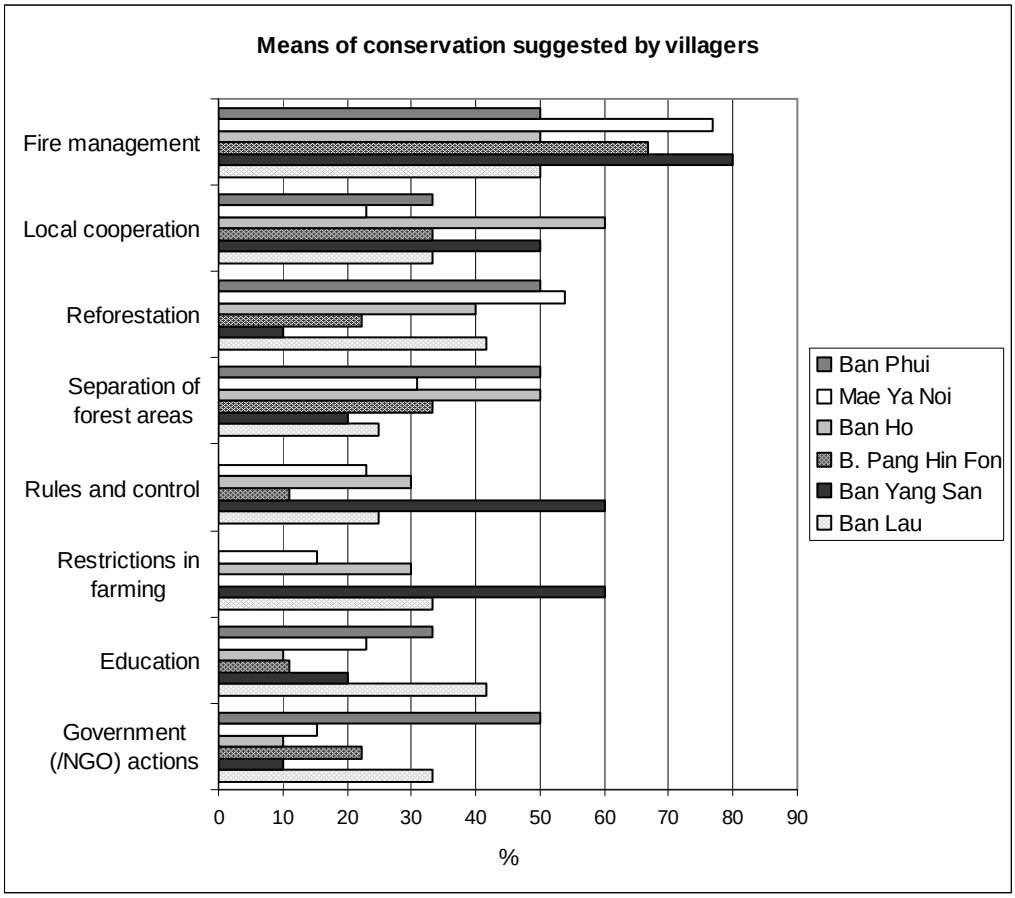

Figure 17. Means of conservation suggested by villagers by percentage of responses per village.

The objectives of forest conservation were directly related to responses on the significance of the forest: water, pleasant weather, the need for wood, and habitats for people and wildlife were used as a reasoning why conservation was considered important. A group of Lawa, however, brought up a further aspect why they had intensified the protection of their forests: They wanted to keep their lands out of the planned national park area. They, anyway, immediately continued that conservation is for their own benefit. Another objective of conservation, furthermore, that some respondents indicated was that the forest should be preserved for children so that they could learn "about the trees and nature". A group of Hmong women, in addition, expressed that they tried their best to protect the surrounding forest because visitors had admired it.

Focus on fire prevention

Because of the natural conditions that made the forests susceptible to fire, and because fire was still commonly used in farming systems, fire prevention was regarded as crucial for forest conservation. It was, in fact, the most often mentioned method for forest conservation (63% of respondents mentioned fire in reference to threats to forest conservation). About half of the

interviewees (49%) who were asked with which concrete actions they personally protected the forest referred to fire prevention. Most of them mentioned the firebreaks; in addition, some men told that in case of fire they participated in extinguishing the fire. Some villagers also acted as fire watchmen. Generally, both men and women participated in the fire prevention activities.

In the Thai village Ban Lau, however, the issue of fire prevention was viewed somewhat differently as compared to the other villages. Only two interviewees referred to firebreak preparation. One of them told that the Care had allocated funds to solve the problem of forest fire but it did not help. The other one, in turn, explained that the village committee had warned the villagers not to light fire in the forest and organised the preparation of firebreaks. Despite these efforts, some villagers may have excluded burning from deforestation. Perhaps this attitude is related to the fact that the hills adjacent to the village were burned every year at the end of dry season. One respondent referred to the reason of this burning by saying that a disadvantage of a conservation area is that it makes it more difficult to obtain a certain mushroom species that is believed to require burning before it can be found. In Ban Lau, the interviewees sometimes referred to their co-villagers when burning was discussed, while in the other villages people primarily suggested that forest fires were started by outsiders.

The interconnection between the condition of the forest and forest fires was referred to a couple of times. Two Lawa respondents explained that the forest is more resistant to fire when trees are large, while small trees burn easily, and, thus, the forest, such as the one surrounding the village, helps in stopping the fire. Another interviewee in Ban Ho described that the fire is more devastating in deforested areas. She was afraid of fire, which, she said, could destroy the whole village and was, moreover, concerned about who will take care of fire prevention in the planned national park near the village.

Owing to the conservation area and firebreaks, forest fires occurred less frequently than in the past. Fire as a tool to clear new fields in the forest was seldom used, unlike in the past. Furthermore, concrete results of fire control had been noticed: For example, a Hmong man from Mae Ya Noi, where the establishment of a national park had obviously brought along vigorous campaigns for fire management, noted that more forest products could be gathered now that they had a firebreak. In addition, the village headman of Mae Ya Noi had observed an increase in the number of trees due to prevention of fire.

Cooperation: central for conservation

Three types of cooperation in environmental protection could be distinguished from the community point of view: cooperation of villagers within a community, collaboration with other villages, and conservation in co-ordination with non-governmental and government organisations. In particular, cooperation within communities seemed in people's views to be central for conservation of the forests in each village. However, it seemed less important in the Thai village Ban Lau than in the other villages because there only one third of the respondents referred to this aspect, whereas in the other villages a half or more of the respondents mentioned community cooperation as necessary for environmental protection. This was especially emphasised in Ban Ho where cooperation within the village seemed to work well. The villagers of Ban Yang San also gave an impression that collaboration of the villagers was running smoothly, whereas in the Hmong villages joint activities did exist but improved cooperation was viewed to be needed, as in the case of Ban Lau. In total, 38% of the interviewees indicated that local cooperation is important for conservation. Sometimes the importance of further improving the cooperation was highlighted; an interviewee in Ban Phui, for example, hoped for better cooperation with organisations from outside the village, and one villager in Ban Yang San emphasised that all stakeholders must help each other, villagers and the government.

The villages had many activities for conservation and fire prevention. In particular, making firebreaks and participating in the extinguishing of fire were activities that required

collaboration within villages. Fire watching was also organised within the communities. One notable aspect of cooperation was the prevention of illegal logging. In enforcing the rules and in organising the various activities, the role of the village committee was often emphasised. The village committee headed by the village headman was also regarded as an institution for distributing information and for increasing awareness.

Collaboration between communities including different ethnic groups by village networks within the same watershed was a relatively new idea. Cooperation between villages was, however, mentioned in three villages: Ban Ho, Ban Lau and Ban Yang San. One respondent from Ban Lau expressed the view that more participation of the villagers and the neighbours would be needed. Cooperation with the RFD was mentioned in a few responses but, for the most part, government actions were mentioned in relation to conservation, not to highlight their necessity as such but because they were carried out in the area. Sometimes they were even considered as unwanted, as in the case of reforestation. Stronger government support was, however, in some cases expected for controlling the conservation areas, and, occasionally, a wish for financial support was expressed (although often other needs for funding were more urgent). Furthermore, even if the government involvement was sometimes viewed as unwelcome, the efforts of the King were appreciated and it seemed that the villagers wanted to help His Majesty to conserve the forests.

People often reported that the villagers had started to preserve their forests, and later on the RFD and the Care had begun to help them in this task. On the other hand, sometimes the interviewees indicated that they were helping the RFD in conservation efforts. An old woman from Ban Pang Hin Fon even stated that they had to participate, whether willing or not, in forest management activities organised by outsiders; the tambon organisation had given the instructions that the villagers had to follow although they had been unfamiliar with the management practices. In brief, some of the interviewees said that the RFD and NGOs help the villagers in conservation, whereas some others viewed the situation vice versa. In Mae Ya Noi, Ban Ho and Ban Yang San, the villagers seemed to have a consensus and appeared to be committed to conservation. On the other hand, in Ban Phui and Ban Pang Hin Fon, people often referred to government activities in which they were assisting. One respondent in Ban Pang Hin Fon was of the opinion that one more organisation from outside the village would be a good help in forest protection. Furthermore, the interviewees in Ban Phui more often than those in the other villages mentioned government actions as necessary for conservation. This implied a tendency in some villagers to emphasise the government responsibility. Meanwhile, the villagers of Ban Yang San and Ban Ho tended to emphasise the significance of their own activities. One Lawa man, for instance, suggested that in Ban Ho no help from outside is needed.

A general opinion, however, seemed to be that the villagers regarded themselves as competent managers of the forest. This was expressed also because the fear of losing farming land or even being relocated if the RFD started to control the area more tightly. Nevertheless, support from the government and NGOs was commonly appreciated. In addition to financial support, supply of seedlings for reforestation, enforcement of regulations and control by the government were mentioned as the primary ways of outside assistance. As the Karen and Lawa viewed that they had conserved the forests before the outsiders came to the area, they hoped that the government could help them in doing that. Government officials were expected to impose penalties on illegal loggers. The villagers regarded themselves as capable of monitoring their own forest area but they often required officials to solve the problem of illegal logging by punishing those outsiders who come and clear the forest in the village territory.

Division of land use and restrictions on farming

As described before, the forest was in the local forest management system divided into conserved and utilisable areas, in addition to which land for agriculture was separated. This system was widely regarded as a viable means of forest conservation. Interviewees viewed it

as sustainable forest use, sustainable in a sense that it ensured people's livelihoods while maintaining an ecological balance.[42] Firstly, it was regarded as a way to prevent logging in conservation areas because the villagers were able to obtain wood for their household needs from the community forest. Secondly, the system was viewed as preventing encroachment of the forest for farming purposes. For example in Ban Lau, boundaries of the fields were demarcated and checked regularly so as to see that they had not moved. People seemed to appreciate both categories of the forest: the area for utilisation provided the essential wood for construction and fuel, and the protected forest was a source of non-wood forest products such as herbs. Unsurprisingly, though, some people regarded this system as unnecessarily restricting the farming activities.

A central issue in forest protection that came up in the interviews in general was agriculture. As mentioned earlier, agriculture, particularly rotational slash-and-burn cultivation, was also locally named as a reason for deforestation. Restrictions in farming were, thus, referred to as a means to control deforestation under the pressures of land use although contrasting views appeared as well. The necessity of restrictions was most often expressed in Ban Yang San and a few times also in Ban Lau and Ban Ho. Hmong farmers seldom mentioned this as a way to protect the forests; two interviewees in Mae Ya Noi did but no one in Ban Phui or Ban Pang Hin Fon. A problem in agricultural restrictions was that the population was growing, and controlling agricultural expansion was difficult due to the landless people, inheritance of land, and people's striving for better livelihood. A solution that was suggested was seeking for alternative sources of livelihood.

When discussing forest conservation, some interviewees referred to erosion prevention as a means of environmental protection and to the forest as being important in preventing erosion and maintaining the soil fertility. Three interviewees suggested planting specific grasses and bushes on hillsides, and one mentioned terracing as a good way to control erosion. However, one respondent considered soil erosion solely as a problem of the past, although a common opinion seemed to be that in traditional swiddening erosion was no problem but it is to some extent in permanent fields. An old Hmong man in Ban Phui stated that forests and soil fertility are connected. He explained that conservation of the forest is important because the rains are heavy, and when the ground has a leaf cover, the rainwater will seep into the soil, which makes it fertile.

Tree planting as a tool for forest protection and rehabilitation

Sustainable use of the forest was commonly considered to include planting of trees. One interviewee, for example, said: "If a villager cuts ten trees from the community forest, he or she has to replant ten trees." Despite some responses of this type, it seemed obvious that reforestation was regarded as a government-initiated effort in which the villagers often participated in the name of conservation rather than an essential means of conservation. Reforestation projects in Mae Ya Noi and Ban Phui, for instance, could explain the frequency with which reforestation was mentioned in these villages in particular when discussing conservation. Altogether, about one third of the interviewees (37%) referred to planting of trees as a means to maintain the forests and thirteen interviewees (22%) mentioned participation in tree planting as an effort they themselves made to protect the forest. In each village, people were involved in reforestation activities initiated by the RFD although often only one member of the household, usually a man, participated.

Tree planting was, nevertheless, viewed as playing a central role in stopping the deforestation, and in rehabilitating deforested and degraded areas. It was suggested that further efforts to protect the environment could and should include planting of trees. On the other hand, reforestation attempts were sometimes regarded as unnecessary and natural

[42] Sustainability was defined by the researcher and translated to the interviewees when asking the question.

regeneration of the forest preferred. For example, a Lawa man held the view that no reforestation was needed because trees were able to regenerate naturally.

Another reason for discontent with reforestation efforts was the selection of species planted as explained in the previous chapter. A Karen man from Ban Yang San, for instance, was unsatisfied with the tree species used in reforestation and, therefore, preferred just leaving the area to regenerate naturally. Moreover, it was implied that a problem with the ongoing reforestation projects was that they provided no livelihood. In addition, as previously described, a further problem of reforestation was related to the concern of farming land being taken for tree planting. Therefore, reforestation – although often expressed as a way to combat deforestation and a tool for conservation – was regarded with suspicion and considered to be a government activity, in which the villagers had the responsibility to participate.

Relevance of rules in protecting the forest

Forest conservation, from the villagers' point of view, required rules and control, particularly by the villagers themselves. The village rule, including the regulations set by ancestors, were regarded as important for conservation. One respondent from Ban Ho stated that people conform with the rules of the community because consensus is predominant among the villagers. Consensus, however, seemed to be stronger in some villages than in others. The villagers of Ban Yang San and Ban Ho most distinctly stressed the importance of local actions and rules. The results gave an impression that the extent to which individual-centred cash cropping on permanent farms was dominant in the community could have an effect on how successful village rules were for conservation.

The communities enforced their village rule, but regulation and control by the government were also viewed as significant, particularly when people from outside the community threatened the forest. Only in Ban Phui no one brought up the aspect of rules in conservation, whereas in Ban Yang San it was pointed out more often than in the other villages. The Karen in Ban Yang San stressed in particular the crucial role of community control in protecting the forests. Cultural factors may also affect views on rules. The issue of regulation seemed to be more significant for the Karen (about half of the Karen respondents referred to this aspect) than for the Hmong (among whom the corresponding figure was about 10%). Altogether, about one fourth of the interviewees (27%) suggested rules as a tool for forest protection.

Indications of who has the main contribution to making the rules of forest conservation and use varied to some extent; the government and the village committee were regarded as playing a central role. In Ban Ho, the villagers highlighted their own role in setting the rules without government involvement, although legislation was referred to. To establish the village rule the people of Ban Ho had had negotiations until consensus was achieved, which made the villagers willing to conform with the rules. The role of the village committee was pointed out also in Ban Yang San. On the other hand, the role of the government seemed again to be stressed in Ban Phui. Regulations as a means for conservation were, after Ban Phui, least recognised in Ban Pang Hin Fon.

The interviewees seemed to appreciate strict rules for protected areas while they emphasised the importance of having a community forest for use, albeit with certain restrictions. Hence, on the one hand, the existence of rules for a certain conservation area was appreciated. On the other had, a rule allowing the villagers to use another forest area for construction wood, for instance, was regarded at least as important. Rules and their enforcement were viewed as not only the means to protect the existing conservation areas but also in wider perspective a means to stop deforestation. An interviewee in Ban Yang San concluded that "if people respect the law, the nature will survive".

Emphasis on education and knowledge

Education and knowledge were regarded as relevant for forest conservation: approximately 23% of the persons interviewed referred to education in this context, with the highest percentage in Ban Lau. Education was perceived as a means to enhance sustainability of forest use. Both the young and the old were viewed as needing education; old people were expected to share their knowledge with the young, but, on the other hand, the older generation was often considered to lack knowledge about conservation. Often, however, the need to educate the young was especially emphasised. Other villagers and sometimes government officials were seen to act as sources of environmental information.

Some interviewees considered it important to raise people's environmental awareness: to tell them about the significance of the forest and to teach them to value it. Some responses implied that education should be given especially to those who still cut trees or burn the forest; for example, a young woman from Ban Lau held the view that it is difficult to stop deforestation as some people are ignorant. Likewise, an old Thai man expressed his concern about people's lack of knowledge, which he considered as an environmental problem. A similar view was expressed by a young Hmong woman in Mae Ya Noi who stated that everyone would help in conservation if he or she understood the importance of the forest. A Lawa respondent from Ban Ho considered that people should be educated to live together with the forest. Moreover, the village headman of Ban Yang San wanted awareness to be raised so that people would respect the forest and not view it only in commercial terms.

Sustainable use of the forest and non-timber forest products

When asked about sustainable use of the forest, several respondents emphasised the significance of conservation by the means described above. The most common response was that trees should not be cut at all (about one third referred to this). The existence of the community forest was often viewed as a precondition for having a conservation area because it provided a supply of construction wood. However, some differences appeared when people specified which trees should particularly be protected: large or small trees. A reason given for saving the young trees was the need to let them mature, whereas others held the view that large trees should not be cut to minimise disturbance. In addition, preventing of forest fires, planting of trees, and also education were suggested for being included in the sustainable use of the forest.

Forest conservation was perceived important because of the forest products; for example, a Hmong women's group stated that herbs would die without the forest. Instead of cutting trees, collection of non-timber forest products was regarded as a sustainable way to utilise the forest: Approximately half of the respondents (57%) mentioned forest products in the context of conservation and sustainable use of the forest. Only one man from Ban Ho had the opinion that the best way to protect the forest would be to forbid any use of it.

An attempt had been made to achieve the sustainable use of forest products was tried to ensure with rules, as described above. For the case of firewood, it was often emphasised that only dead wood is collected. Although the use of some areas was also traditionally restricted, the restrictions tended to be rather flexible. For example, in the temple area in Ban Lau, felling of trees was banned but collecting of leaves for roofs and dead wood for fuel was allowed. Restrictions to secure sustainability were common particularly the case of in hunting. The Karen tended to view that their traditional systems of hunting and fishing were sustainable and could continue to be that without the influence of outsiders. Meanwhile, the Thai revealed to have only a few taboos concerning trees or animals.

Despite efforts to ensure the availability of forest products, a new problem with the availability of firewood had appeared along with the conservation areas and the abandonment of rotational farming. This had been noted also in Ban Ho, and although the situation was still fairly good because it was possible to collect firewood from swidden fields, people had

already started to recognise that a solution should be found in the future. Planting trees was one idea, but the question what trees should be planted was open.

A couple of interviewees, Karen and Hmong, referred to subsistence use of forest products and to the idea that the forest should be used only to the extent that is necessary. They emphasised that the forest use should be limited to subsistence needs only as marketing of forest products, particularly wood, threatens the sustainability. It was also remarked that the better the condition of the forest is the better is the availability of forest products. As one Lawa man from Ban Ho expressed it: "Conservation is the sustainable way to use the forest; that is how also people can get enough to live." The sustainable use of the forest was considered to require taking care of the forest, and, moreover, some interviewees pointed out that the trees should not be damaged when gathering forest products. In some cases, however, it seemed that the use of the forest was understood as cutting wood (perhaps because of translation), and collection of non-wood forest products was excluded.

In Hmong language, no word for sustainability exists but the meaning was understood when defined in interviews as maintaining livelihood without disturbing the balance of the nature. A young Hmong woman from Ban Phui summed up her idea of sustainability: "If we do not cut trees, we can use the forest forever and obtain forest products." Projects led from outside may also have affected the Hmong view of sustainability.

People perceived the forest not only significant but fundamental for their livelihood in each village, and, therefore, they regarded protection of forests as essential, although in the background other motivations for conservation existed as well. The uplanders tended to think that they were capable of conserving the forest by themselves, particularly when the traditions had remained strong. The Karen and Lawa appeared to have maintained their traditions of conservation to certain extent, and they still adhered to the conception of humans living in harmony with the nature.

Circumstances had changed quite considerably during the past decades and even the traditional systems, which still prevailed some decades ago before the active involvement of the government, could by no means always ensure sustainability under the prevailing situation. In addition, the protected areas often tended to be rather scattered in traditional systems, whereas the government goals for protected areas were more ambitious. Furthermore, over-hunting may have occurred in the past as a result of increased pressures on natural resources. Thus, romanticising the past must be avoided although the Karen and Lawa tended to emphasise that they had managed to maintain the surrounding forests for generations with their traditional management systems. They, therefore, regarded it as unfair that they were blamed for deforestation. Moreover, they also thought it as unfair that they were expected to make sacrifices to satisfy the conservation requirements of the government.

6.6 Different angles on conservation

As described, generally all the villagers seemed to agree that conservation of the forest is important. Conservation has also been the government's priority. The village headman of Ban Lau, for example, also pointed out that the objective of forest conservation is the same for all parties in spite of the conflicting views. Hence, one might think that with this consensus conflicts could be avoided. The situation is, however, more complicated. This was well summed up by a villager in Ban Pang Hin Fon: "…to save the forest for people themselves. Everyone thinks the same – to make people to protect the forest. There are different views between the local people and the government. The government wants to protect the forest but people cannot any more collect forest products nor cultivate, which causes a conflict." Thus, some tension had appeared between the locals and officials but also at the local level. Within the villages studied, nevertheless, no significant conflicts seemed to exist at the time of the study – although it should be noted that discussion on any disagreement is commonly avoided, at least with outsiders, in the society studied. Anyhow, based on discussions with the villagers, observations and interviews of local NGO workers, it seemed that a conclusion that

no severe conflicts occurred in the villages studied could be drawn although some minor controversies with other communities were noticeable.

Collisions of local communities

Disagreements within a village were seldom expressed – and even if some disputes within a village took place, the villagers solved them with the help of the village committee. Nevertheless, the interviewees sometimes implied that a few problems had appeared regarding conservation. None of the interviewees, though, accused any specified group of people of destroying or damaging the forest but indicated, nevertheless, that some people cut trees in the conservation area. When considered as an inter-village problem, this problem seemed practically non-existent in Ban Ho and in Ban Yang San, but some clues of its existence in other villages appeared. One interviewee both in Mae Ya Noi and in Ban Pang Hin Fon suspected that some illegal logging took place, but most commonly these problems with people who cut trees against existing the rules seemed to occur in Ban Phui and Ban Lau. A solution to this problem suggested in Ban Phui was to take these people to the officials and let them solve it. However, the illegal cutting was told to be mainly for household construction needs, and because the communities were relatively small, they could most often solve these malpractices on their own.

Another inter-village problem also appeared. Every now and then some villagers refused to cooperate in conservation efforts. An old Thai man, for example, viewed it as an environmental concern that some people failed to participate in their village conservation activities. The same problem was implied to occur also in Ban Yang San although otherwise the informants mentioned no malpractices by the villagers.

In comparison to the cases found within villages, the controversies between neighbouring villages and ethnic groups were perhaps more problematic, although even this seemed to be no major issue in the area studied. A potential source of dispute was that the boundaries between villages were often unclear. Another potentially contentious issue concerned the use of biocides in upland farms that was suspected to affect the lowlanders. This was no major source of dispute in the villages studied either, probably because they were mostly upland villages, although general concerns of the effects of agricultural chemicals were commonly expressed. Scarcity of water was also a common concern, but (quite likely for the same reason)[43] conflicts had thus far been avoided in the villages studied. The main problem seemed to be the people from neighbouring villages breaking the rules set by the villagers. Forest fires were perhaps the most acute source of tension between communities.

Disputes with nearby communities had occurred particularly in Ban Yang San, basically between the Karen of the village and the lowland Thai. An intractable problem was expressed: the villagers blamed the Thais for burning the forest. This had happened despite the fact that Thai villages were also included in a forest protection network of the area. In a group interview, the men of the village complained that the Thais lit up the fire, sometimes even inside the fire protection lines. The Karen then had no choice but to try to extinguish it. They told an example from the previous year when they attempted to extinguish the fire for ten days.

One reason for starting the fire was hunting, which in addition to the forest fires was a concern in Ban Yang San: the villagers considered that populations of some animals, such as wild pigs and deer, had decreased significantly because of hunting by the lowlanders. The lowlanders were suspected to hunt for sale, whereas the Karen stated that they only hunted for their own use and knew the sustainable ways of hunting.

[43] Furthermore, in 2002, when the material was mainly collected, rains were abundant. For instance, the dry season in 2004–2005 was harsh.

Even a more serious concern than hunting which the villagers expressed was the encroachment of the Thai from the adjacent lowland villages to the territory of Ban Yang San; the lowland people were said to have encroached the village lands with their fields. An interviewee, furthermore, indicated that the lowland people may have environmental knowledge but to date they fail to apply it. Another villager was concerned of how to control the outsiders and prevent them from logging in the village area. Related to this, one interviewee urged the lowlanders to look for a place for tree planting so that they would have no need to extract wood from the uplands. Moreover, wealthy outsiders were blamed for cutting all the teak stands that used to surround the village.

Some remarks, apart from those concerning tension between the Karen and the Thai, were made about differing views of the Karen and the Hmong. These appeared, in particular, in the Karen villages of Huay Bong and Huay Kiper, which were visited to gather additional information and to gain a better understanding of the area. In these villages, the Thais were also accused of over-hunting and over-fishing. No actual conflict existed, however, either with the Thai, or with the Hmong who were thought to cause deforestation. The informants described that the forests had vanished from the surroundings of the Hmong villages because the Hmong had cleared large forest areas to cultivate cabbage, which, as it was added, requires plenty of agricultural chemicals. Similarly, one Lawa interviewee from Ban Ho expressed an opinion that the Hmong lack the protective attitude towards the forests and burn the forest every year in order to expand their fields to grow more cabbage. He added that also the Thai burn the forest.

Thus, the attitudes of the Karen and Lawa appeared basically parallel to the general opinion that has regarded the Hmong as commercially oriented and less conservation-minded than the Karen and Lawa. Likewise, some tension between upland and lowland dwellers was recorded, although conflicts in the Pang Hin Fon area under study seemed anyway unlikely because the population predominantly consisted of upland groups. The village headman of Ban Yang San was of the opinion that the problem lies in the lack of understanding between ethnic groups and in their differing views on environmental conservation. The solution, in his opinion, was to educate people.

Conflict between conservation and forest dweller livelihood

The villagers and the government seemed to perceive forest conservation somewhat differently, as has been outlined: the government has tended to favour total protection and central control whereas the villagers have put the emphasis on livelihood and their own capacity for forest management. In the villagers' view, the forest could be conserved even if gathering of forest products, including limited extraction of wood, was allowed. In general, the villagers considered themselves as capable and competent to manage the forests and able to fulfil conservation requirements. Meanwhile, the government has had doubts that the forests would disappear under villager control. On the other hand, controversies between the RFD and the villagers had diminished since the villages had separated the conservation and utility forest areas; disagreements were basically limited to the enlargement of the national park area.

The enlargement of the national park area was a concern for the people in Ban Ho, Ban Pang Hin Fon and, to some extent, Ban Phui. The concern was that with the national park establishment people would lose the right to collect non-timber forest products; the villagers were aware of the fact that a national park has strict regulations while the village rules are more flexible. In addition to the right to gather such forest products as herbs and fruits, people were worried about the availability of construction wood and firewood. Even a concern about the accessibility of water was expressed because of the restrictions to enter the national park.

The most serious fear of the villagers related to the national park establishment was, however, the shortage of agricultural land. It had already decreased due to forest conservation, and the national park would restrict farming even more. The village headman of

Ban Ho was one of those of the opinion that because farming land would become insufficient with the establishment of the national park, the government should organise alternative means of livelihood for the villagers. Instead of a national park, he suggested that the villagers should be given the right to manage the forest by themselves.

It was indicated in the interviews that the government had changed its strategy for allocating new areas for the national park during the past two years. Before, villagers seemed to have had fewer chances to participate in the process, and in some cases they even were afraid of getting arrested. For instance, in the case of Mae Ya Noi, no meeting with the community members took place when the village was included in the Doi Inthanon National Park. But now officials had intensified the negotiations with the villagers; for example, the people in Ban Ho and Ban Phui were negotiating at the time of the first fieldwork period of the present study with the government about their rights in the planned national park. In the case of Ban Phui, the Mae Tho National Park was in the process of extending to the village area at the time of the fieldwork in 2004 although the final agreements with the villagers were in some cases still lacking.

Despite the improved opportunities of the villagers to participate in national park planning, they sometimes felt that they had only limited chances to influence the final decision-making. In Ban Ho, for example, the result of the negotiations between national park officials and the villagers was that each household ceded one plot of their rotational farming land to the national park. However, an impression remained that they were obliged to assign an area for the national park or otherwise they might have lost a considerably larger area. Furthermore, the people of Ban Ho feared that the national park will require even more land from the villagers and that they eventually have to give up rotational farming. This worried people because they had only a few paddy fields and their livelihood seemed to be threatened. Figure 18 shows the land use model of Ban Ho inside the national park as it was when the fieldwork was completed.

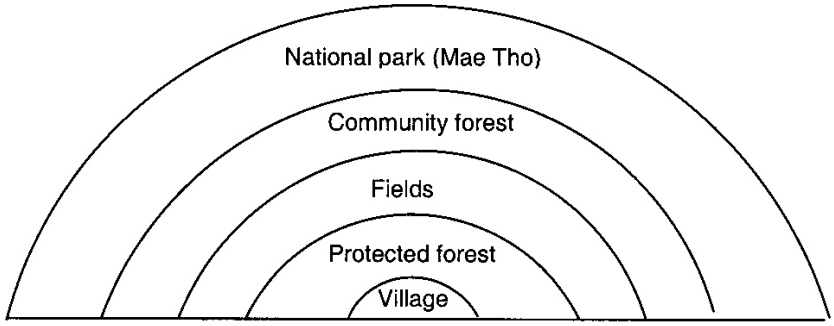

Figure 18. Land use model of Ban Ho village within Mae Tho National Park. The agricultural zone includes both rotational farming and permanent fields.

In Ban Pang Hin Fon, the situation was that the villagers were asked for 100,000 *rai* for the national park, but the process had stagnated because the villagers had refused. They had, however, their conservation area, which was located high up on the mountain and was anyway unsuitable for farming. Hence, some villagers thought that that area could be taken to the national park. In an adjacent village Ban Phui Tai Karen, people were willing to help the villages that belonged to the planned national park area, to prevent the park from extending to their territory.

A problem with a national park, from the villagers' point of view, was that no one was officially allowed to live within its borders. People living inside Doi Inthanon National Park, in Mae Ya Noi, for instance, had had to negotiate with the government about plans to relocate the

village. Due to these plans of relocation, all the proposals to develop village infrastructure, such as electrification or repairing of the road, were rejected. One villager told that electrification of Mae Ya Noi was already accepted in one government organisation, but the RFD reversed this decision. Moreover, the village road, which was important for taking products to the market, was in poor condition, but the RFD refused to give any help in repairing it. Because of this policy a young man in Mae Ya Noi felt that the RFD disliked the village although he was unable to name any reason for that. Another villager, a woman who had moved to Mae Ya Noi twenty five years back, was ready to move from the village if people were provided land, but the problem was, she stated, that no land would be available in the lowlands. One man opposed the relocation plan by saying that the villagers would have difficulties to adapt to live in a town where, he suspected, no occupation could be found for the relocated villagers. People in the other villages were also well aware of the problems in infrastructure created by national parks, and this was also a reason to oppose the extension of the park to the village area.

Many problems were associated with national parks, but, in general, benefits of the conservation areas were commonly acknowledged; only six respondents mentioned any disadvantages related to the current system of protected forests when they were asked about benefits and disadvantages. It is, though, possible that due to cultural and other reasons people were hesitant to convey any negative aspects when directly asked. Three interviewees mentioned competition for land or the shortage of agricultural land as a disadvantage. Other aspects referred to included the difficulty to find mushrooms and a ban on the use of construction wood. Furthermore, concerns that the villagers would lose the control of their surrounding environment were expressed, for instance, regarding fire prevention if the forest was included in a national park.

Although the villagers tended to appreciate the efforts of forest conservation, their worry was how to find alternative means of livelihood appropriate for the area. They felt that the government had helped them insufficiently in generating better sources of income. The villagers would have liked to have help in developing the agricultural production and in creating new income-generating opportunities, such as weaving or cattle raising. A problem for finding alternative means of livelihood in a national park area was that the sale of handicrafts made of forest products from that area would be prohibited. In addition to these expectations directly related to livelihood, improvements in infrastructure were also included in the villagers' wish list.

Suspicion towards the government still existed although decentralisation and improved participation of the local people had gradually reduced it. At first, when the RFD officers started the reforestation activities in the area, for example, people were distrustful because no dialogue took place. They would have also needed help from officials in protecting their territory from the outsiders who came to log or farm in the area, which they, however, they felt they lacked.

The Karen and the Lawa, furthermore, tended to think that even if they had tried to protect their environment all the time, they were, nevertheless, unfairly blamed for devastating their environment. In their view, it was actually the outsiders, lowlanders, who had destroyed the environment. For example, the villagers of Ban Yang San complained that every year they had to extinguish the fire coming from the lowland, or, otherwise, the RFD would blame them and consequently even possibly relocate them.

Commercial logging in the past was considered as having an effect on the lives of the uplanders even today and perhaps as still forcing them to unsustainable practices. Moreover, many Karen and Lawa viewed their traditional rotational farming system as sustainable and could see no other reason why the government wanted to halt it but a poor knowledge of the system. Furthermore, some people expressed that it was the force from the government side that made the villagers to separate the conservation forest from the village territory. A clear reason was that they feared relocation and allocated forest for conservation so as to prevent officials from doing that and maybe enlarging the national park to the village area.

From prejudice to cooperation

Several officials, academics and NGO workers interviewed indicated that the business orientation of the Hmong was a cause of environmental problems. This was because the Hmong were using biocides in large amounts and expanding their fields. In contrast, the Karen, and also the Lawa, were typically viewed as subsistence farmers who protected the forest. A NGO worker described the difference between ethnic groups: “The Karen and Lawa think that the forest is life, the Thai and the Hmong think that the forest is capital”. It is the Hmong who are considered as problematic although sometimes all ethnic minorities are lumped into one group of hill tribes who log illegally to clear the way for agriculture. One high RFD official, for example, defined the Hmong as people who are mistrusted and half of the group of Karen as people who still can be trusted. Moreover, illegal immigration of upland minority people from neighbouring countries was considered a problem in terms of potential forest loss (as described in Chapter 5.2). It was also suspected that sometimes the uplanders may protect their own forest but at the same time cause damage to their neighbours' forest.

The villagers considered the ignorance of the outsiders, in particular that of high government officials, as a problem because it resulted in prejudice against and misunderstanding of the upland people. One of the main issues subjected to misjudgement from the viewpoint of the villagers was rotational cultivation. In the Mae Tum watershed area, for instance, this was considered a major problem and, as a result of the demands of the local people, the government-commissioned study on the environmental effects of rotational cultivation had been carried out. It was hoped that the study could improve the position of the villagers in negotiations on the demarcation of conservation and agricultural lands. Inadequate knowledge of the situation at the local level became evident, for example, in the statement defining people’s greed as the main reason for environmental problems in the uplands.

Alongside with smooth cooperation also some disputes had occurred with the Care project because of its approach to work closely together with government officials. Hence, the Care was often associated with the RFD and regarded as its collaborator, for example, working with officials to stop slash-and-burn cultivation. Environmental changes have created disagreement between NGOs and some other stakeholders, such as people’s organisations. From the Care’s point of view, people’s organisations stress economic improvement, but the Care had a concern that a good land-use system could be ruined by business emphasis. In general, those (environmental) NGOs that are of the opinion that the forests should be left in a natural state with no inhabitants had little support among the communities. (Jutapong 2002, pers. comm.). All in all, the NGOs form a very heterogeneous group of actors, and some of them work in close cooperation with the government.

Despite disagreement with officials on some issues, such as reforestation or establishment of national parks, the villagers recognised the need for some cooperation. The officials interviewed also acknowledged that cooperation with the villagers in forest management is needed – although this was not expressed in relation to conservation as such; instead, cooperation in fire management and reforestation was regarded as important. For example, in the Pang Hin Fon area people were hired to plant trees; an RFD field officer described the villagers as cooperative. The central administration pursued to work with the local administration and selected NGOs to promote local-level cooperation.

6.7 Villager contentment with current forest management

The majority of the interviewees (51 of 57, 89%) expressed satisfaction with the prevailing way of forest management. The justifications given referred to the situation that the forest area had expanded and deforestation had ceased. A few people were basically content with the government rules but complained that some local people disobeyed those rules or that some villagers may take an advantage of this system and continue to cut trees against

regulations. Furthermore, some interviewees were satisfied with the forest management system but would have wished even more reforestation and protection activities. On the other hand, the villagers seemed to wish no extension on forest management. Although they considered education and awareness raising important in conservation, none of the respondents indicated any (further) needs for forest management extension. They were confident of their own competence in forest management.

The question is whether the interviewees were actually satisfied with the current system of forest management or whether they expressed what they thought they were expected to? Considering the information gathered by the interviews, which indicated the significance of the forest for people's livelihood and thus motivation for conservation, it seemed that people's contentment largely referred to the achievements of the current system in protecting the forests.

Dissatisfaction was also expressed, particularly regarding the availability of farming land and trees planted in reforestation schemes. The reasons for discontent over the prevailing forest management systems (indicated in 4 of 57 responses) were largely similar: The main concerns were related to the increase in protected land area at the expense of farming lands, and to the lacking possibilities to expand fields, and, on the other hand, to violations of the forest conservation rules. These violations included uncontrollable expansion of farming land and illegal logging. One respondent expressed the need for better techniques, for instance, in fire management. Furthermore, in remote villages the lack of infrastructure and even the lack of technical devices, for instance, in fire management were perceived as disadvantages of the current system.

The main problem the villagers indicated, however, seemed to be rather the behaviour of other villagers than actually the government policy. Nevertheless, this is a question that must be analysed critically, as the villagers may have been unwilling to express negative aspects of the government activities, and it was perhaps easier to complain about local people's behaviour than about government activities, although they were also criticised. It can be even suspected that people who clearly stated their satisfactions with the new system may have had other issues that they were dissatisfied with but were just hesitant to express that. In some cases, contentment with the forest management practised in the village was expressed, but the role of the government was left without comment. It seemed, furthermore, that most of the villagers had no knowledge about the national logging ban on natural forests. Only a few, mainly relatively well-educated men, were aware of the ban, but the responses implied that the impact at village level was viewed as rather insignificant. As one respondent pointed out, it affected only the commercial loggers, not the people in the village. Thus, the logging ban seemed to have no effect on the level of satisfaction with the prevailing forest management.

Participation in forest management

In principle, the TAO Act had provided the villages with an option and responsibility to participate in natural resource management in their own territory. The law was, however, new and the procedures and practices still in need for development. Moreover, the lack of a community forestry law made the objectives of management decentralisation and conservation somewhat contradictory.

At the community level, everybody was supposed to cooperate in village forest management activities. This meant, for instance, that in practice one representative per household participated in forest conservation organised within a village. On the other hand, extinguishing a forest fire, for example, could require participation of all capable villagers. In small villages, such as those now studied, community cooperation was easy to organise. It was organised by the villagers themselves or by the RFD, depending on the village and the activity. As can be seen from the examples of village rules, participation in forest management activities could even be obligatory. In particular, the women felt that they knew very little about forest

management but they just followed the instructions from the officials, in the tambon administration for instance.

Organisation of forest management activities was usually mainly a task of men, as the majority of village committee members were men. The Karen and Lawa women, however, took part in the activities as often as the men although men more often attended meetings. Among the Lawa, rituals related to the forest were a men's duty. Some tasks related to forest products were divided between men and women; for example, herbs were gathered both by men and women. Sawing and hunting were essentially men's tasks, while catching of aquatic animals and gathering of firewood were mainly tasks of women. Both men and women tended to participate in the activities of fire management also in other villages.

The Hmong men and women also basically shared tasks. Nevertheless, it could be the case that mostly men carried out the activities in the forest, including ceremonies such as *Dong-seng*. Some Hmong women expressed that they lacked opportunities to participate. For example, uneducated women in Ban Pang Hin Fon explained that they had no information about forest management because the discussions in village meetings were in Thai which they could not understand[44]. Thai language was used because four ethnic groups were represented in the meetings. Moreover, only men tended to participate in those meetings. One Hmong woman indicated that the women of the village would like to receive information about the environment in general, not just specifically on forest management.

In Ban Phui, Hmong women wished to have more responsibility in forest management but felt unable to participate because they lacked education and traditional knowledge. Furthermore, the Karen women in Ban Yang San felt that they lacked information on legislation, which hindered them from participating in decision-making. They, however, had their own group, which was active, for example, in protecting an adjacent stream to ensure catches of aquatic animals. The Thai women In Ban Lau reasoned that they do not participate because they lack time.

The motivation to follow the forest management system promoted by the officials included three aspects crucial from the villager point of view. Firstly, the villagers were concerned of the extension of national parks. In the villages adjacent to Mae Tho National Park, people had a view that if they could delimit the conservation areas themselves, these areas would be excluded from the national park in the future. On the other hand, where the forest remained, pressure from the government side existed for including it in a national park. Secondly, the motivation to protect the forest was, nevertheless, strong because the villagers regarded relocation as an existing threat and therefore wanted to show to officials that they were capable of maintaining the forests. Thirdly, a reason for forest protection and following the government regulation was that the villagers feared that they would otherwise lose their agricultural land. They hoped that if officials are satisfied with their management system, they will be allowed to continue cultivating their existing fields.

In addition to the pressure from the government side, the villagers had other sources of motivation to manage the forests in the village territory. The village rules that were made essentially by the villagers themselves were a good indication of their will for sustainable management of their environment. The rules included regulations, for example, for fire management because the villagers wanted to avoid property and environmental damages caused by forest fires.

[44] The problem of language barrier as a limitation for participation was also noted in a forest project in Lampang, the neighbouring province, which was also visited.

6.8 Environmental information: sources and differences

To gain an idea how people's perceptions of the environment and forest management were formed, they were asked about their sources of information. This was included in the interviews also in order to see what the role of outsiders was as distributors of environmental information. It seemed that in this area training and education within various forest projects was common, and this must have affected the views of the villagers' to some extent. In addition, people of various ages and different ethnic groups could be expected to possess different knowledge and, therefore, questions were presented on these differences. It appeared that differences could be identified between age groups, but much less between men and women. A comparison between ethnic groups seemed difficult, and it was implied that although differences may have occurred, they were cultural rather than actual differences in the knowledge of, for instance, forest species.

Learning about the environment and forest management

The villagers obtained their information on the environment from four main sources: elders in the village, own parents, outsiders, and from own experiences. Discussions among villagers were considered as one significant source of information (Fig. 19). The subject matters learned from parents or village elders contained knowledge of agricultural methods, forest species, and forest products, such as herbs and their uses, and also of the places in the forest that should be protected and of taboo places. This kind of knowledge was regarded as originating from the ancestors. It was implied, however, that this knowledge from ancestors was of minor importance today because the circumstances had changed. Changes, such as the decrease in wildlife and limitations brought along with conservation had shifted people's livelihood to become less forest-based. Changing circumstances were also encouraging the farmers to learn agricultural practices by doing and experimenting, in addition to the lessons learned from parents.

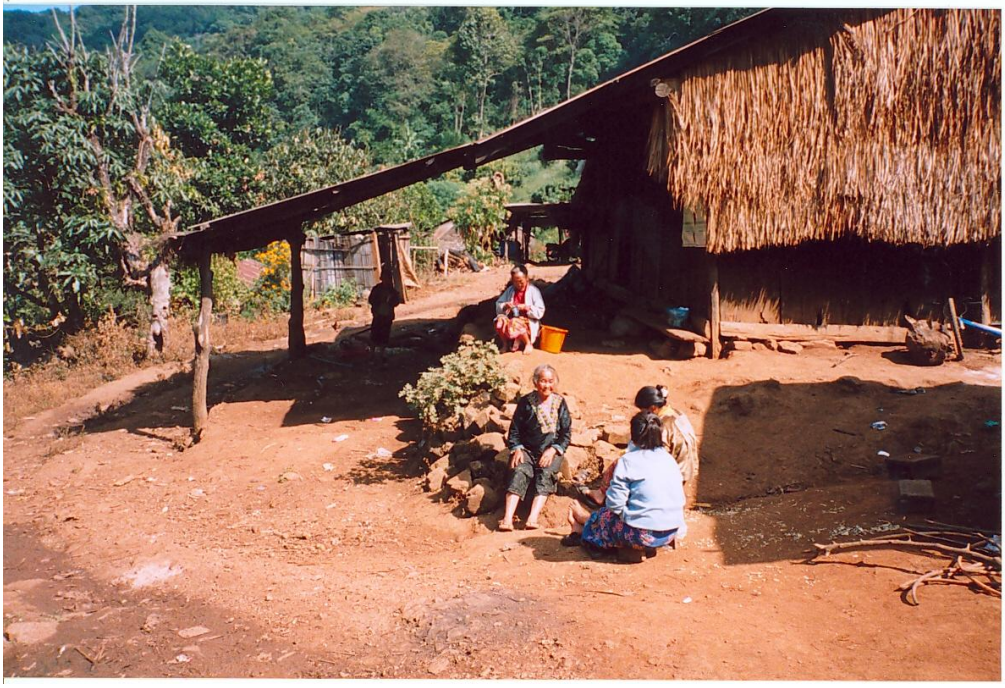

Figure 19. Learning from parents and other villagers was an important source of environmental information. (Photograph: Minna Hares).

Some issues, such as effects of deforestation, were often learned by own observations, which were usually regarded as important as or sometimes even more important than the knowledge received from the village elders. This was understandable against the constant changes in the circumstances. The Lawa, however, emphasised the importance of village elders and parents, particularly the old and knowledgeable co-villagers, as sources of information even more than their own experiences. Ban Ho had managed to maintain its traditions relatively well compared to the other villages, and people there seemed to be confident in applying knowledge that had its roots in the history of the village.

A few older, uneducated women considered that they learn environmental issues from the children because children learn about the environment at school. They seemed to appreciate the theoretical knowledge over the practical one as the environmental education given at school was regarded as basically theoretical. It appeared that the environmental education, with a particular emphasis on conservation, had been included in the curriculum recently, and, for example, two decades ago it was lacking. Hence, those who mentioned the school as a source of their own environmental knowledge were young people. However, also limitations of the theoretical knowledge learned at school were implied, for example, by stating that "[a]t school they just tell about the usefulness of the forest and organise some reforestation activities". The practical environmental education at schools may have suffered because teachers who often came from outside and had temporary assignments might have lacked the interest in and perhaps the knowledge of the local situation. An attempt to improve the environmental education at schools appeared, however, to be in the government's interest, and the Care had a project to promote practical education although the lack of funding hindered its complete implementation.

People regarded that outsiders, particularly officials, were also significant in distributing information. Middle-aged people quite often expressed that they obtained information from the government, that is RFD officials, although, in general, that seemed to be a less important source of information than their own experiences and old people. The village headman played a central role in distributing information from the government, district and sub-district levels to the villagers and in informing about the watershed network activities.

The interviewees in Mae Ya Noi regarded officials as having a minor significance in distributing information. This seems surprising but can also imply that the villagers lacked such information on agriculture and alternative livelihood which they would have considered important. Anyhow, both the Royal Project and the Queen Sirikit Project included an educational component. An additional source of information was the district agricultural extension, which aimed at promoting permanent farming, although the extension services seemed to have failed in reaching all the uplanders.

In addition to officials, also the NGOs, especially the Care, provided environmental education for villagers. At the beginning, the education in Care projects had started with cash crops, after which farmers had been trained in agroforestry, and then the focus had shifted to watershed management. The Care helped people to respond to the demands of the RFD, for example, by assisting in the compilation of the village rule and the separation of their territory into conservation and community forests and agricultural land. apart from the Care, some other NGOs, in particular those working with ethnic minority issues, were mentioned. Sometimes people made no difference between the Care and the officials but all that information was labelled as coming from outside.

The outside information seemed to be concentrated on forest protection. In addition to saving the trees, also reforestation, fire management, protection of wildlife, and conservation of soil and water resources seemed to be central in the information from the outside, and especially in that from the officials. The education on the significance of the forest was emphasised; for example, the district chief of Mae Chaem (Jongruk 2002, pers. comm.) listed education, awareness raising, rules in communities, and laws as the four steps that were required to

achieve the goal of sustainable use of the forest. In brief, the information from officials mainly included attempts to halt the rotational cultivation and the expansion of the agricultural area, and, primarily, to protect the forest. This was, however, contradictory to the Karen and Lawa traditional thinking, which was based on an idea that the rotational cultivation system and protection of the environment were interconnected. A central justification for conservation given to the villagers was to improve the availability of water. Sometimes people felt that the outsiders just criticise the uplanders.

On the one hand, some interviewees held an opinion that no need for environmental information from outside existed. One interviewee, for example, expressed the opinion that may be shared by many other villagers as well: the young woman in Mae Ya Noi stated that everyone is already aware of the environmental matters, but despite that they sometimes need to cut a tree to build a house. Another interviewee, the deputy village headman of Ban Phui, was of the opinion that people know about the effects of deforestation and, instead of the efforts to raise their awareness of the importance of conservation, people should be provided information about income generation possibilities. On the other hand, particularly the women seemed to hold the view that information from outside is required. It was suggested that information should be given to the villagers who then could discuss it among themselves.

The role of the mass media as a channel for environmental information seemed to be minor. This was expected as the villages had no or limited electricity supplies, several people were illiterate or could not understand Thai, and the level of income was low. Nevertheless, some interviewees mentioned the radio as a source of information. It seemed to be one channel for officials to distribute information to the villagers. One interviewee presumed that the young people may learn by listening to the radio or even by watching television.

The preferred channels through which people wanted to receive information were parents teaching their children, discussions between the villagers (including village meetings), and the announcements by the village headman. Some interviewees regarded the environmental education given by teachers at the school as relevant, but, generally, it was considered even more important that parents teach their children. Sometimes, particularly the young men and the old women held the view that the young should explain the environmental issues to the elder people to make them understand. Information from outside the village was seldom viewed as a preferred channel of information. It was, furthermore, pointed out that men and women should be able to receive the same information. Joint discussions with the villagers were emphasised as a means of distributing information and deciding on environmental issues.

The information that the villagers regarded as useful for them was the knowledge of edible forest products and, in particular, of medicinal plants and their uses, on which they often wished to receive more information. One interviewee, furthermore, wished to have more information on the poisonous species referring especially to mushrooms, in which he had tried to clarify poisonousness by himself by boiling them. The interviewees in Ban Pang Hin Fon particularly stressed the significance of environmental knowledge to forest dwellers, and the village headman stated that it is possible to live in the forest even if no hospital was nearby. Moreover, he continued that traditional herbs are even better than the commercial medicines as they have no side effects.

Environmental knowledge of different groups

The interviewees were able to identify some differences in environmental knowledge between groups varying by age, gender or ethnicity. They most often observed differences between age groups; old people were regarded as more knowledgeable than the young, especially in women's responses. It was noted that both the source and the type of knowledge can differ. Old people were viewed to know more about farming methods, especially swiddening, herbs, and tree species, and, for example, which tree species are good for soil conservation. They had learned this by their own experience and from the previous generation. Currently, an

increasing flow of information was coming from outside, and that was usually the kind of information viewed as lacking from the old people.

The young learned about the environment at school and from the older generation. Furthermore, young men, for instance, had the best opportunities to educate themselves and participate in forestry and agricultural training. Therefore it was suggested in Ban Ho that the younger generation was more knowledgeable about conservation, of which the information came mainly from outside, while the old knew more about traditional farming techniques, which had been learned from the previous generation and by experience. Reflecting this difference the village headman of Mae Ya Noi suggested that the young and the old should discuss and combine their theoretical and practical knowledge. In any case, it was recognised, though, that the knowledge varied between individuals. Differences were recognised as appearing, for instance, due to people's varying interests, although the basic education was similar for all who went to school and thus diminished the individual dissimilarities. On the other hand, one interviewee regarded it as impossible to compare the young and the old because they had grown up under different conditions.

Minor differences in the environmental knowledge were noted between men and women or among ethnic groups. The insignificance of most such differences was explained by the similar environment and by the common sources of information. Nevertheless, the men were, in general, regarded as knowing somewhat more than the women, for instance, about legislation and conservation. The difference seemed to originate from the distinct tasks of men and women. It was suggested among the Lawa in Ban Ho that women know less because they have so much work at home and men have more chances to go to the forest. In that connection, it was also indicated that girls were afraid of going by themselves inside the forest. Similarly, the Karen tradition assigned the men to work in the forest and the women to basically work at home. Among the Hmong, the tasks of men and women were also referred to. For example, a Hmong man in Ban Pang Hin Fon suggested that women know the herbs better, whereas men have more knowledge of trees and animals; women also collected edible forest products and herbs while men hunted and supplied wood for construction.

Some gender-related differences in the opportunities to receive information were identified. The Hmong women in Ban Pang Hin Fon complained that they were often left inadequately informed about issues concerning forest management. The main constraint in receiving information was that it was basically provided in the village meetings, in which usually one man from each household participated and where the discussion was in Thai. Thai was the language used because the village had members from four ethnic groups and one common language was needed. The uneducated Hmong women of the village understood no Thai or understood it poorly, which is why they felt themselves uninformed and in need for improved opportunities to obtain information.

Differences in the environmental knowledge between ethnic groups were analysed in particular in Ban Pang Hin Fon, where the ethnic groups lived side by side. No major differences were identified, however. For example, the difference between the Karen and the Hmong was described by using a tree as an example: the Hmong may use its leaves to cure stomach ache, while the Karen may utilise the same tree for some other purpose. The differences that appeared were, thus, regarded as results from differing culture and lifestyle. Many medicinal herbs that the upland villagers used were, on the other hand, the same among different groups.

Farming methods and the occupation were considered to affect knowledge of the environment. The slash-and-burn cultivation system was the reason for variation in environmental knowledge between the swiddening people, the Karen and the Lawa, and, on the other hand, the Hmong. In addition, it was stated that the Karen are more knowledgeable about forest products than the Hmong, who concentrate on farming; the Karen were thought to live closer to nature and the Karen themselves also emphasised the meaning of rituals for living in harmony with nature. However, this cannot be generalised. In Ban Pang Hin Fon, for instance, the situation was different: the Karen largely worked as wage labour, and the village

headman held the view that the Hmong of the village know more about forest products, and herbs in particular, than the Karen. Furthermore, residence had an effect as well: those who lived in remote areas and close to nature were supposed to possess more environmental knowledge than those who lived in or adjacent to urban areas. It was even considered that if the people moved from the village to Chiang Mai, their environmental knowledge would become poor. Furthermore, an interviewee in Ban Yang San suspected that even if the lowlanders may possess environmental knowledge, they now failed to act accordingly.

In general, a concern of the loss of knowledge of forest species and products was expressed. One reason given was that the forest had degraded. Another explanation found was the lack of information sharing: the old no longer taught the young as they used to, and, in general, people do not teach each other. A Karen man in Ban Pang Hin Fon estimated that the villagers knew only about 25–30% of the utilisable species, and a Hmong woman in the same village suggested that only a few villagers were knowledgeable about the forest products. If young people lacked the knowledge of the species that can be gathered and only some old people were experts on forest products, a danger existed for this information to become lost, particularly if the young desired alternatives to their parents' livelihood. In addition, an old Thai woman gave a concrete example of the deteriorating knowledge by saying that the young know tree species poorly because houses are nowadays made of concrete instead of wood. It was also viewed that as children go to school to learn new things, they have little chance to go to the forest and learn about their environment. Moreover, in the case children went to school in town, the opportunities to learn about forest were even fewer. A young Hmong woman had an opinion that probably held true for many cases: if people are uninterested in the knowledge concerning forest products or species and have other objects of interest, they know little about the species in the forest.

Traditional animist rituals were linked to environmental management and based on knowledge of the environment. In addition, Buddhist monks sometimes provided environmental education for young men at temples. In Christian churches this seemed to be lacking. As a consequence of conversion to Christianity, some information that a community traditionally held may be lost. This kind of knowledge was in danger of deteriorating also, and even more so, because of the transition to commercial cropping and permanent fields as well as migration to urban areas. These changes played a role in people's alienation from nature, whereas in the traditional rituals people could feel interconnectedness with their environment.

Apart from the environmental knowledge as such, also other factors affected community forestry practices, as emphasised in theoretical framework of environmental literacy. Figure 20 sums up the main factors related to environmental literacy on forest management that shaped the natural resource management practices in the villages studied. Ideas on forest functions and services, including the cultural aspects, had an influence on forest management practices, and so did the outside factors together with the information on the environment and political requirements, although the latter one seemed sometimes to be inadequate. On the other hand, actions taken had created new knowledge of natural resource management.

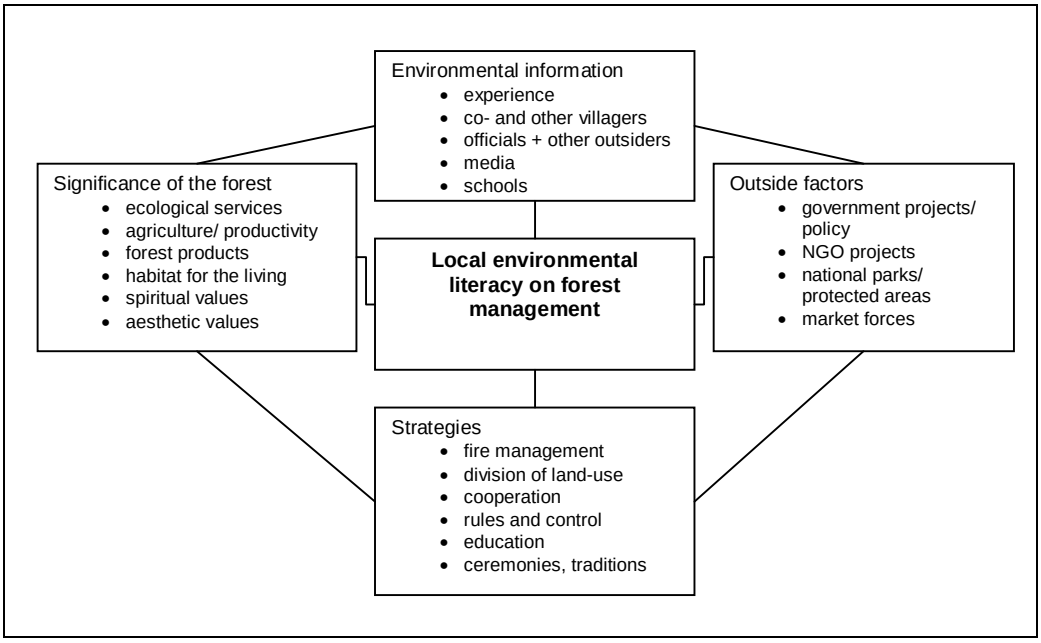

Figure 20. Summary of the key elements of local environmental literacy.

7. DISCUSSION

7.1 Change of traditional management systems

The purpose of this study was to illustrate under the concept of environmental literacy how forest management and deforestation were perceived by the local people, and what motivations existed for conservation. The basis of motivation was found in the values of the forest for the local people and the management practices had adapted to changing conditions and integrated both new and traditional elements. Changes were not only environmental but included also social and economic effects on local people. New elements of management were largely introduced by officials and determined by government policy. Some introduced elements, however, induced resistance among the villagers, who proved to be not just passive objects but who took an active role in negotiating with authorities. These discussions of appropriate strategies were influenced by discourses on upland minorities and forests, which had used definitions, terms, discredit and stereotypes to advance the various stakeholders' purposes.

Integrating traditional and introduced forest management

The village forest management practices included both traditional and introduced elements. The villages studied basically followed a similar introduced forest management system. The new system had forced the villagers to redefine their forest areas by using the introduced division between conservation and utility or community forest (Laungaramsri 1998, 50). Traditions in management varied according to beliefs, lifestyle and farming systems but were in a process of radical change because of the government-induced transformation of farming systems.

Despite efforts of decentralisation, which were still at the beginning of a long process, in the study area the government control of forest management had increased during the past few decades. One reason had been the establishment of the Mae Tho National Park. On the other hand, forest management was also used as a political tool; the villagers used it to secure community rights, and, furthermore, could use it even as a possible channel to express resistance (see Ganjanapan 2000, 206–15; Brown et al. 2005).

The national logging ban on natural forests, which also covered the community forests, formed the regulatory basis of introduced systems. Nevertheless, most villagers were actually unaware of the ban. Its indirect effects as exemplified by tightened control, the expansion of national parks and an increased emphasis on conservation in general have, however, touched the forest dwellers as has been described. The introduced division of forest land into three categories within the villages can be regarded as an indication of indirect impact. A total ban on cutting trees or utilisation of forest products seems, however, in the light of some research results not the best solution for biodiversity conservation or forest protection: For example, in the study by Nitaya Kijtewachakul et al. (2002) in northern Thailand the utility forests were found to regenerate better and have a higher biodiversity than the village conservation forests. In forest health and succession, no substantial difference was found, but the utility forest had a higher density, especially of seedlings and saplings. (Kijtewachakul et al. 2002).

Introduced systems have to some extent merged with the traditional ones, which may not necessarily have had conservation as such as a primary objective; conservation practices have related to the preservation of the supply of forest products and services, such as water, agricultural production, or the availability of construction material (cf. Santasombat 2003, 181). These purposes, centred on the values of the forest, formed the basis for the forest management objectives and priorities of the local people. Products and services of the forest, with water and microclimate as the most important, were regarded as necessary for the people in their life in the uplands. Same aspects were appreciated in the upland villages as in the lowland Thai village. Thus, the main reason why conservation of the forest was perceived

as an important objective was because it benefits for local people. Economic objectives were not expressed, which may also have been due to restrictions. The only economic prospect that was a few times mentioned was tourism, which was regarded as an option for additional income, for example, in the Hmong village Mae Ya Noi and in Ban Ho, in its new village Ban Ho Mai. On the other hand, some Karen suspected that tourism could provide income only for few villagers and may prove unsustainable for upland livelihood.

Given this context of local management objectives, the general satisfaction with the government forest management that was expressed in the villages becomes understandable – even if it may sound contradictory in the Thailand case because of the marginal position of upland minority groups, the prevailing top-down approach, and the strict conservation emphasis of the forest policy. The main source of disagreement shown by the results was the establishment of national parks, which reflected different emphasis in the government and among the local people: the government aimed at enlarging the area of strictly protected forests, while the villagers stressed protection by sustainable use. The insecurity of land tenure, which was related to the conservation emphasis of the government, was a problem from the villagers' viewpoint (see also Ganjanapan 2000). Furthermore, another contradiction seemed to exist between the inadequate participation of the local people (e.g. Laungaramsri 2002; Santasombat 2003) and the villagers' contentment with the prevailing situation. Participatory practices have been evolving, and the villagers seemed to have maintained a certain feeling of control over their natural resource management, particularly through village committees, despite the insecurities in land rights. Foundation of management strategies on traditional practices and community land-use patterns increases their acceptability (Ganjanapan 2000, 72).

Effects of changes in upland agriculture

The government has managed to eradicate the slash-and-burn cultivation systems in many areas also in the North. They are, though, still practiced in some remote areas, mainly in the western parts of the North close to the Myanmar border. The results implied that the eradication of slash-and-burn agriculture has, however, had, apart from environmental effects, also considerable cultural and economic effects within those groups whose livelihood used to be dependent on this farming system. This refers particularly to the swiddeners traditionally growing rice, such as the Karen and Lawa. The Hmong have also had to change their lifestyle quite considerably. These changes have also had links to the fate of the upland forests.

One of the multifaceted consequences of agricultural transition has been the increase in cash cropping, which can have environmental impacts. For example, Philip Dearden (1995) suggests that the low value of cash crops, in particular, cabbage, as compared to that of opium poppy can lead to expansion of the agricultural area at the expense of the forest. Although the further investigation by of Tungittiplakorn and Dearden (2002) did not support this argument[45], the results of the present study indicate that the poor profitability of cash crops, especially cabbage, combined with increasing needs for cash income for education, health services and farming in permanent fields, for example, may increase the pressure to encroach the forest with farms. Furthermore, as the above-mentioned studies also recognised (Dearden 1995; Tungittiplakorn & Dearden 2002), contamination of the environment due to an excessive use of agricultural chemicals remains a relevant concern.

The variety of crops that farmers grew in their swiddens had changed along with the transition to permanent farming. The upland farmers have been encouraged to plant new cash crops, often new to the area. This may cause environmental problems because of increased

[45] Contrary to Tungittiplakorn and Dearden (2002), who argue that alternative crops (particularly cut flowers and cabbage) substituted the income from opium quite well, Jean Michaud (1997) states that alternative agricultural practices have not proved as profitable as opium poppy cultivation. The ones whose economy suffered most were those whose earnings from opium had been low and who, hence, lacked the resources when the transition to other commercial crops took place.

requirements for fertilisers, chemicals and irrigation[46]. Economic risks, moreover, appear when a farmer has to make relatively high investments and is dependent on only a few crops. Apart from economic risk, the use of agricultural chemicals had also other negative consequences from the local farmers' aspect: health problems and harmful effects for the environment.

A concern exists, thus, that business-driven intensive farming systems contribute to deforestation, biodiversity loss, water shortage because of increased needs for irrigation water, contamination of water due to increased chemical use, and land degradation in general (Rerkasem 2003, 327). The problems from the farmers' point of view include capital intensity, fluctuating market prices, and the higher risks associated with monocropping, as compared to the intercropping typical for swiddens. Hard competition in the market with Chinese farmers, for example, makes cash cropping even more risky (Rerkasem 2003, 327; Bhumibhamon 2004, pers. comm.).

A locally important social change has been that cash cropping takes more of the farmers' time than the traditional farming systems, and therefore the farmers have less time, for example, for social interaction or making handicrafts. When the farmers have no time for handicrafts, it means that the items formerly made in the community must now be purchased, which further increases the need for cash. A reduced time for gathering forest products results eventually in a decline of the environmental literacy on forest products and their uses (Tungittiplakorn & Dearden 2002).

Introduced agricultural systems also mean that the environmental literacy related to traditional crops and farming systems is deteriorating or has already vanished. By now, a loss of several local agricultural plants or varieties has occurred because they have been replaced by cash crops, and the diversity of crops grown in permanent fields is smaller than that in the traditional system (Dearden 1995, 331–2; Santasombat 2003, 66–67). The question thus arises how to preserve the genetic diversity of crops such as rice, which has been grown in numerous local varieties in the swiddens (Foppes & Ketphanh 2004, 185). Moreover, upland farming systems have also created biodiversity, which has been significant for the local livelihood (Laungaramsri 2002, 192); for example, the highest diversity of non-timber forest products, has been reported in forests belonging to long-fallow cycle. Stopping of rotational cultivation could thus have a negative effect on biodiversity[47]. (Gansberghe 2004, 25, 36). The decline in the variety of forest products and local crop varieties may also pose a potential threat to food security (Santasombat 2003, 83).

Apart from the knowledge on crops, other types of environmental information included in local environmental literacy have been "ignored and lost in the name of progress, development and commercial farming" (Chiengthong 2003, 158). The definition of swiddening as a backward farming system has lead to overlooking of its positive aspects (Rerkasem 2003, 330). Despite its advantages for upland farming and its popularity among farmers, rotational swiddening should not, however, be romanticised. The land use pressure is high and the yield per unit area is usually lower in swiddens than in other farming systems (Mertz 2002, 156). In the villages now studied, not all the farmers wished to be able to return to slash-and-burn cultivation. On the other hand, some villagers nevertheless indicated that they would have liked to return to their traditional rotational swiddening. Furthermore, the Karen and Lawa commonly expressed that they would have preferred the management of the forests according to their own traditions, although cooperation with the government was also appreciated. This result is consistent with the findings of Ayudhaya and Ross (1998, 6–7) in their study of Mae Lu Karen village in Mae Chaem.

[46] Some introduced cash-crops, for example, certain vegetables and fruit trees, require irrigation during the dry season (Rerkasem 2003, 327).
[47] On the effects of slash-and-burn farming on the biodiversity in forests, see Myllyntaus et al. (2002).

Vanishing traditions

Alienation from traditions in the study area seemed to have taken place basically in three ways: most importantly, because of the discontinuation of traditional swidden farming (in each village except for Ban Ho); secondly, because of conversion to Christianity (particularly in Ban Ho); and, thirdly, because of wage labour work forming the main source of livelihood (especially for the Karen in Ban Pang Hin Fon), which was related to the abandonment of the traditional farming systems. In addition, the degradation and disappearance of forests had contributed to vanishing of traditions, for example, those related to forest products. Moreover, many young people were looking for alternative means of livelihood apart from farming, often from urban areas, and were therefore disinterested in the traditions of natural resource management (cf. e.g. Paisooksantivatana & Kako 1997, 78). However, the present study implied that although this was a growing trend, many young people still had an interest in the traditions of their own community.

The traditional lifestyle of the Lawa, for example, has undergone changes due to influences from outside the community and to the increased pressure on land (Kunstadter 1988, 102). Intermarriages and assimilation with other ethnic groups, together with Christianity, and pressures to abandon swiddening have contributed to these changes. To intensify their agricultural land use, Lawa farmers have increased the number and size of their irrigated fields, which, in turn, has affected the variety of crop plants. Growing of cash crops has been encouraged by the outside influences that had increased in the Lawa communities generating a need for cash. In addition, the swidden land used to be the property of the whole community, but the irrigated fields were individually owned and these individual property rights were becoming increasingly common. In addition, irrigation agriculture requires the use of draught animals in farm work, which increases grazing pressure in fallows, and thus hinders natural regeneration of the forest. (Kunstadter 1988, 102–4). Similar changes have taken place in Karen communities. The Karen elders, for instance, have become concerned that the young generation is losing the Karen identity as "children of nature" and consequently also some of their environmental literacy (Santasombat 2004, 111).

The practice of field rotation has been viewed as playing a significant role in maintaining plant and also animal diversity (Laungaramsri 2002, 192–3). The Karen's success in cultivating the same areas as long as for two centuries has been viewed, especially by the Karen themselves and some NGOs, to prove their ability to maintain ecological stability. During the past decades also the Karen, just as the other upland forest dwellers, have had to adapt to an altered situation and changed their farming practices, sometimes radically. The change from swiddening to permanent cultivation mainly of paddy rice or cash crops has meant a loss of the environmental literacy related to traditional farming systems and, more generally speaking, a cultural change, because the rotational slash-and-burn was an essential part of the Karen world view and identity (Trakansuphakon 2001, 121–122; Laungaramsri 2002, 191–198; Tomforde 2003). The traditional swidden system of the Karen has been said to be based on respect and protection of nature (Trakansuphakon 2001, 122).

Conversion to Christianity has, in part, affected the traditions and traditional rules: for example, Christians usually do not participate in traditional rituals (Mukamuri 2000, 22). Although this seemed largely to be the case in the villages studied, in other areas also contrasting findings have been reported indicating that Christianity had been assimilated into traditional beliefs and rituals (Santasombat 2004, 118). However, for example, the research results by Jussi Ylhäisi (2000) in Tanzania suggest that the new religions Islam and Christianity had strongly contributed to a situation in which traditions had started to lose ground. Despite this, the traditional sacred forests were still commonly valued and Ylhäisi views the situation as encouraging from the conservation point of view. This seemed largely to be the case also in the northern uplands of Thailand. However, the main reasons for the vanishing of traditions among the uplanders seemed to be the lifestyle with an influence of market forces and with increased integration into society. To prevent the diversity of traditions from vanishing and knowledge of, for example, medicinal plants, some initiatives to preserve traditional cultures have been supported (Chiengthong 2003, 163).

Changes as challenges

Socio-economic changes that have taken place during the past decades have influenced the lives and the environment in the northern uplands. These changes have been induced by several factors. Firstly, the competition over land has increased because of population growth and the migration of lowland farmers and investors into the area, and also because of forest allocation of conservation and the reduction of land availability. Secondly, this has led to shortened fallows and reduced soil fertility and food security. Thirdly, socio-economic changes have emerged because of national and international development programmes, and increased need for cash, and migration to urban areas. (Pettenella 2003; cf. Warren & Pinkston 2000). Road construction is an example on how development projects bring along change to rural areas: the access to markets and opportunities for urban employment for villagers improve and, on the other hand, outsiders, such as agri-business companies, gain better access to the villages (Rigg 1997, 179). Furthermore, apart from road construction changes in agriculture, such as mechanisation, monocropping and the use of chemicals have contributed to loss of biodiversity (Kunstadter 1999). In addition, forest fires, the introduction of new species in agriculture and forestry, environmental degradation and land clearing are also factors aggravating the biodiversity loss which further affects people's livelihood (Niesten et al. 2004, 28).

Some of the changes have had positive effects, but, all in all, the intended and unintended negative effects have posed political challenges to natural resource management and to the securing of livelihood (Kunstadter 1999). Globalisation has inevitably brought along alterations to local practices and cultures (cf. Sarmela 2004). Cultures change and communities redefine themselves constantly. Socio-economic changes have had a tendency to erode the traditional practices and create new ones. The farmers (especially the Hmong), as this study also showed, do not only wait for solutions from outside but experiment themselves in order to adapt to the changing conditions (Turkelboom & Van Keer 1996, 43). a good example of farmer innovation was the agroforestry experimentation with fruit trees found in Ban Pang Hin Fon.

In general, the diverse and often complex pressures on land use may lead to both sustainable and unsustainable practices (Rerkasem 2003, 324). For example, on the one hand, the establishment of new protected areas has driven people to clear new areas in the forest for agriculture or to minimise the fallow periods to maintain their land rights. On the other hand, it has encouraged the communities in conservation to show that they are able to protect the forest without a need to extend a national park to the village territory, or to provide conserved forest land for the protected area instead of having to make over agricultural land.

7.2 Control and negotiations over forest resources

Power relations related to forest resources basically include three types of relationships: 1) between upland and lowland people, 2) among upland dwelling groups (such as the Hmong and Karen) and 3) between local communities and authorities (Tan-Kim-Yong 2002, 2). A fourth category of relationships between the upland communities and private companies or business figures could be added (Santasombat 2003, 189). This fourth case includes mining companies interested in the area and agribusiness companies which have farming contracts with local farmers. In addition, the NGOs have been significant actors also in the present study area. In the communities studied, the first two categories, in which tensions are created largely because of natural resource use and overlapping rights, caused only minor disputes. Moreover, while the most visible NGO, the Care, was rather well accepted by locals and authorities, tension in power negotiations within the third category between the government and local communities was apparent. Central elements in these negotiations were legislation and policies which the state uses to control the forest areas on the one hand, and decentralisation with efforts to increase participation on the other. Networks, people's

organisations and a discourse on customary and human rights, including the maintaining of traditional lifestyles, were the means used by local communities in negotiations with authorities.

It can be questioned whether control through new or stricter laws could be a solution to deforestation and forest degradation. Pearmsak Makarabhirom (1999) argues that forest crime management provides no solutions. On the contrary, confusion between line-agencies and government departments leads to confusion in enforcement; the rural people are easily alienated although they would be of help in preventing the illegal activities in the forests; and the lack of participation can lead to disregard. Furthermore, inconsistencies in laws and regulations that have appeared in the Thai case have made practical management decisions more complicated. (Makarabhirom 1999). In addition, laws, control with protected areas, and an idealised conception of undisturbed nature are sources of disputes and distrust between forest dwellers and the government that further impede the process of involving local people in forest management (cf. Roth 2004b). Villagers studied by Robin Roth in the Mae Tho park area, for instance, suspected that the aim of the establishment of the national park was to remove the land rights from the local communities and to use villagers as a free labour force to take care of the area. (Roth 2004a, 25–28).

From the villagers' point of view, on the other hand, the legislation was poorly known and village rules played a central role instead (cf. Vandergeest 1996, 163). The villagers were aware of the strictness of the national park regulations but unaware of the logging ban, for instance. Although the communal property rights seemed to have been recognised inadequately (Ganjanapan 2000, 206–10), that had a somewhat limited effect on the upland villagers, because they continued following the customary property rights. They, however, feared that village lands might be included in the national park. It can, hence, be argued that when the government and the local communities act at different levels that do not collide, the two systems can coexist side by side, but a collision is to be expected when the government wants to increase its control at the community level.

Protected areas are a means of increasing the government control. The establishment of conserved forest areas within village territories is a way for the government to maintain authority over these lands (Ganjanapan 2000, 206–10; Wilshusen et al. 2002; Buergin 2003, 382). At first, the government wanted to control the northern forests to ensure the availability of teak, the second stage was gazetting of protected and reserved areas, which further increased the state control over the area, and at the third stage scientific criteria were used to justify the control (Vandergeest 1996). In particular, national parks provide the government a means to continue controlling these areas regardless of the contents of the possibly forthcoming community forestry law.

Forest policy has served also other political purposes than preservation the remaining forests that are mostly situated in upland areas. National integrity and security have been significant underlying goals of various upland programmes. Motives related to foreign policy have also been involved in these programmes; external pressures have led the Thai government to intensify its efforts to eradicate opium poppy cultivation. The fear of communist insurgency was also related to wider global issues than just to national definition of policy. During the past decades, a discussion on the hydrological effects of deforestation in uplands on the water balance of lowland areas has been utilised to justify restrictions in the use of land classified as forest, such as the banning of slash-and-burn cultivation. Development programmes for upland minorities have had positive effects, but a crucial problem still exists: The lack of mutual understanding between the government and the heterogeneous group of upland minorities with limited access to political power remains to be unsolved. Furthermore, directing development programmes almost exclusively to solve the "hill tribe problem" deflects, sometimes conveniently, the attention from other agents, such as agricultural and other business interests, corruption, incompetence in management, and inefficiencies in policy-making (Rigg 1997, 119).

State control over the forests has marginalised the local natural resource use. Therefore, the upland communities have attempted to gain legal control over their surrounding forests through a community forestry law. (Tomforde 2003). Although community forestry has existed among the forest dwellers already for ages, many villagers hope to formalise it (Rigg 1993). Attempts to legalise the forest use are also relevant in striving for citizenship rights for upland minorities, and the community forestry movement has played a role in it (Vandergeest 2003, 29–31). With secured citizenship rights uplanders could also better be involved in the development of natural resource management. That would, moreover, serve conservation objectives. The lack of citizenship would, in addition, probably exclude numerous upland minority people from the provisions of the community forestry law if or when it will be enforced.

Many types of power relations are to be taken into account also when examining the local environmental literacy, for example, for natural resource management. The results may reflect people's perceptions of their options rather than their actual priorities and objectives. (Mosse 2002, 19–22). Furthermore, the issues examined are often determined top-down and, consequently, what is appropriate and relevant local environmental literacy has been pre-determined. This is closely related to the definition of "right" knowledge that is wanted to seek. (cf. Kothari 2002).

Insecure land rights as threat to sustainability

Well-defined property rights are often regarded as fundamental for sustainable forest management (Brown et al. 2005). Compared with the policies of the other countries of Mekong region, Thailand's unwillingness to grant land rights to ethnic minorities is exceptional (Rerkasem 2003, 337). In the Thai case, land tenure is a complicated issue, and legislation and practices are contradictory. It could thus be expected that the sustainability of forest management in villages in which landlessness and insecure tenure rights were common would be seriously threatened. The villagers, however, followed customary rules and felt relatively secure on their rights to use the land they were occupying. Basically, inadequate recognition of customary land rights is a source of conflicts. It may also be a religiously sensitive issue pertaining to traditionally protected areas. (Kaarakka & Holmberg 1999, 39). Moreover, the lack of land rights is also a problem for planting trees, such as dipterocarps or teak: planting may not be practised because of the fear that the land could be subsequently defined as forest and taken under government control (Makarabhirom 2002).

A problem may also lie in the promotion of community forestry, according to Andrew Walker (2004): Forestry dominates over agriculture which is the basis of people's livelihood, and planned reforms emphasise therefore community-based management and land tenure. The community forestry law could make the tenure rights of some farmers, particularly the poorest ones, even more insecure in the protected areas. Communal land tenure prevents people from using land as collateral for loans from official sources with relatively low interest. Furthermore, the decision-making power of village committees over land could cause conflicts within communities. (Walker 2004)

Insecurity over land can have various consequences but not all of them are negative. In Chiang Rai, for example, farmers started to plant fruit trees in order to prevent the land from being claimed for reforestation (Sangkapitux et al. 1999, 3). The results revealed that insecurity may also urge people to choose environmentally friendly practices of natural resource management and to establish conservation areas to legitimise their residing in the forest. Such positive effects are, however, inevitably on an unsustainable basis and provide no justification for continuing the insecure situation. The community forestry law could to some extent clarify the rights of land use at the community level, but it has been discussed whether forest management could be successful also without the law (Sato 2003). In any case, regardless of what the property rights are, whether they are individual, communal, or state-based, they alone can provide no guarantee of sustainability in management (Alcorn & Toledo 2000, 239). All in all, it is commonly agreed that tenure security is an important factor,

but actually also various other ways apart from ownership exist to improve it (Brown et al. 2005).

Local power

The upland minority people in the study area could be defined as marginalised in political and socio-economic sense, and geographically they lived in a peripheral area. Furthermore, directing development projects especially to the Hmong may have left some Karen and Lawa communities to a somewhat marginalised position. Despite this, the upland people can by no means be described as powerless. They have means to strive for some of their goals, and they are capable of utilising existing discourses for their own aims (Laungaramsri 2002). For example, in north-eastern Thailand, villagers have used map drawing as a means of territorial claims to prevent a national park from extending to the village territory (Fujita 2000, 107). This method was promoted also within the Care project villages in the study area to establish clear village boundaries. Mapping provides a tool for villagers to communicate with officials (Laungaramsri 1998, 49–50).

Minorities have also founded their own organisations to advocate their viewpoint. The Northern Farmers' Network, for example, has been a significant and fairly visible actor also in the study area. Another organisation that also was working in the study area, was IMPECT (Inter Mountain Peoples' Education and Culture in Thailand Association). IMPECT addresses issues such as land and citizenship rights and connects various ethnic groups (Rutherford 2003, 72). These networks and their alliances with other NGOs and also academics have been an effective tool for the upland minorities to negotiate with authorities (Vandergeest 2003, 28). An example of this cooperation was the people's draft of the Community Forestry Bill.

At the local level, new networks, such as the watershed networks that the Care had promoted in the study area, were emerging. These networks can work apart from local conflict resolution, also as a common voice of the villagers in negotiations with the government. Even outside the organisations the village committees were active in negotiating with officials, for example, on territories to be included in national parks. Another example of the villagers' negotiations with authorities was their demand on replacing eucalypts and pines used in reforestation with other species. In addition, an example of the local activity which Lotte Isager and Søren Ivarsson (2002) describe as counter territorialization[48], is the tree ordination ceremony. The ceremony shows sense of environmental duty and identification with Buddhist Thai society; for the upland minorities the tree ordination ceremony provides a means to pay respect to the King and the Buddha, the two central elements of the Thai national identity (Isager & Ivarsson 2002).

Involvement of local communities

The discussion on community rights and the capabilities of communities for natural resource management has also included the issues of social justice, decentralisation and democratisation (Buergin 2003, 381). Although it is admitted that the local communities cannot self-evidently be expected to be especially motivated for or possessing expertise of sustainable natural resource management in their area of residence (Enters & Anderson 2000, 174), it is acknowledged that forest management, in order to be sustainable, presumes that the local people and their objectives and views are involved (Chambers 1997, 181–2). Communities, understood as heterogeneous local actor groups, and their involvement also in decision-making is regarded as crucial for conservation of the remaining forests (Agrawal &

[48] Counter territorialization can be understood as resistance to state territorialization, which can be defined as a process in which the state draws boundaries around an area to be able to control people and their actions and defines the activities and categories of people that are allowed within the determined boundaries (Vandergeest 1996, 159).

Gibson 1999). In addition to the right to make decisions, forest communities are regarded as needing the authority to protect their resources from outsiders (Brown et al. 2005). The results of the present case study illustrate that this was important for the villagers: although they regarded their communities as capable of controlling the use of forests themselves, the lack of authority to prevent outsiders from coming to the village forest area was viewed as a problem if the government were to dominate the management.

Regarding the involvement of local communities as necessary contains basically two aspects. Firstly, environmental problems are complex and require also a local perspective (Berkes 2004). Secondly, the local context as a whole is diverse, complex and dynamic, and perhaps unpredictable, which makes a participatory approach to understand it more applicable than simplified and standardised approaches (Chambers 1997, 187). A participatory approach is widely acknowledged as the way to find appropriate solutions for local environment and socio-cultural setting. For example, in the area studied when introducing new crops, a participatory approach would result in more appropriate alternatives than the existing ones. Moreover, the participation of various stakeholders is necessary to avoid conflicts (FAO 2005b). At best, providing an opportunity to meaningful participation is also a means for empowerment (Kellert et al. 2000). Even further, forest management may work as a tool for self-determination for ethnic minorities, which has been illustrated in the cases in Indonesia and the Philippines, for example (Brown et al. 2005).

The inefficiency of state-centred approaches in local natural resource management has been reported in several studies (e.g. Nummelin & Virtanen 2000, 221). On the other hand, when the FAO wanted to find examples on successful management, the top candidates shared the emphasis on participation, empowerment, maintaining of cultural integrity, and improving of livelihood options (Brown et al. 2005). This tells about a political focus on community-based approaches. While the roles of communities and the local administration are highlighted, the significance of the role of the state may even be questioned. However, state power is not necessarily malevolent (Li 2002, 277). In addition to local strategies that tend to emphasise the protection of such biodiversity that is of local utility or spiritual value also wider-scale approaches are needed, for example, in the conservation of unique habitats, and therefore national and global-level actors are also important (Dearden et al. 1998; Walters 2004, 190). Moreover, a large geographical spread of an ecosystem that is wanted to become protected also requires a wider approach (Agrawal & Gibson 1999, 634). Thus, both top-down and bottom-up approaches are needed (Capistrano & Colfer 2005, 298). Apart from the participation of local people in decision-making, that of the local officials in the social activities of villages could help in building mutual trust and understanding (Makarabhirom 2002).

An example of centralised decision-making that changed to become somewhat more participatory during the implementation process was the establishment of the Mae Tho National Park (Roth 2004a). At the beginning, the villagers had very little to say in the plans. An officer had been given the task to negotiate with the villagers in Pang Hin Fon, but still in 2002 they seemed to have little information on the ongoing process and few chances to participate. When the villagers obtained information on the plans, they started to defend their rights; they had discussions within the community and also with other communities and NGOs, they negotiated with the local national park officials, and one village (Sedusá) even prepared a letter to the Minister. As a result, the process was interrupted and negotiations with the villagers were carried out. TAOs (Tambon Administrative Organisations) played a significant role as mediators in these negotiations. The officials expected the TAOs to make people to agree with the authorities. Furthermore, in addition to the resistance of the local people, another factor that may have affected the way of action of the officials was the reorganisation of the forest administration in 2002. The negotiations with the villagers still continued during the third field exercise for the present study in 2004. The locals were more involved but still felt that they had an inadequate say in the process.

The results of the present study support the view that the main direction of planning, decision-making and monitoring in natural resource management is still top-down, despite the decentralisation efforts and the gradually changing attitudes among officials. The change in

attitudes is slow, and the necessity to involve the communities still seems to be reasoned by the impossibility for the RFD to guard every square inch of the forests all the time (Kaosa-ard 2000, 9). In any case, the devolving of the rights and responsibilities of forest management down to the tambon level, not to mention the community level, is not an easy task. Forest management by heterogeneous and economically differentiated communities can be difficult because resources that used to be communally managed have increasingly been privatised and traditional local institutions weakened. Unclarity regarding benefit-sharing, and the lack of technical and, in some cases, financial support can make local management efforts to fail. (Mukamuri 2000). With its scarce resources the local administration (TAOs) has to make choices, and the natural resource management is seldom prioritised before the basic services.

This study implied that despite all the difficulties and the differing local groups, co-management of the forest is a viable option also in ethnically diverse areas. Cooperation between communities seemed to be more predominant than the conflicts, and this atmosphere of motivation for working together prevailed, for example, in the watershed networks,. Meanwhile, the centralised system failed to provide a good basis for cooperation between villagers and authorities (Nalampoon 2003).

Decentralisation in natural resource management

Decentralisation is an effort for involving lower administrational levels in decision-making, and it includes the distribution of responsibilities as well as rights. It is well applicable to the management of natural resources, firstly, because it can provide flexibility that is needed for diverse resources with multiple uses and interests. Secondly, it provides better possibilities than the central administration to apply local environmental literacy and to solve local conflicts that may arise due to claims of access and restrictions. (Ribot 2002, 6). On the one hand, decentralisation requires a strong central administration (Ribot 2002, 16; Ferguson & Chandrasekharan 2005, 80). On the other hand, decentralisation is required for making local people's participation meaningful (Larson 2005, 47).

A problem is that decentralisation tends to concentrate power to certain groups at the local level and empowerment fails to reach those who were the most marginalised before decentralisation, such as poor women (Kellert et al. 2000, 711). Some examples from Africa and Latin America, however, have shown that decentralisation can improve the involvement of some marginalised groups (Ribot 2002, 8–9). Nevertheless, decentralisation provides no automatic solution to sustainable management, which should also be kept in mind (Castro & Nielsen 2001). It may even be disadvantageous to local people, for example, when it erodes local structures and institutions, uses local people merely as inexpensive labour, supports local elite's power, or when it is used to strengthen the state control over people (Larson 2005, 46, 54). Furthermore, bringing successful local initiatives into the sphere of a decentralisation scheme may sometimes just increase bureaucracy and central control (Edmunds et al. 2003, 175; Sarin et al. 2003).

Responsibilities of decentralisation can, however, be a heavy burden to TAOs when their responsibilities increase more than their resources and capabilities. Therefore, a problem from the forest management aspect is that local administration does not necessarily prioritise natural resource management but, as in the case of many Thai sub-districts, the focus is rather on infrastructural development. This focus as such indicated in the present study no unwillingness to conserve the forest (cf. Larson 2005, 51), but the basic services were considered inadequate and were therefore prioritised.

The local administration is not, however, alone in natural resource management; for instance, the role of NGOs seems to be increasing with the decentralisation process (cf. Chiengthong 2003, 163). Since the national logging ban and the change in the attitudinal atmosphere, the government has started to increasingly cooperate with NGOs, as also the present interviews of RFD officials indicated (see also Mohlenkamp 2003, 434). However, distrust between the

government and some NGOs still exists and conflicts occur. Thus, two kinds of NGOs can be presently distinguished: those that are on a collision course with the government and those that the government cooperates with. Government organisations have selected some NGOs to work with and implemented a working plan with them. Authorities acknowledge the role of NGOs, particularly in promoting capacity-building and supporting community initiatives.

Effects of decentralisation in the field of natural resource management have been reported to vary according to implementation. The impact of decentralisation on forests does not necessarily correlate with its effect on people. (Larson 2005, 55). Sometimes decentralisation may lead to destruction of the forests, which has been the case, for example, in Indonesia (Capistrano & Colfer 2005, 303). This is a worry also in Thailand, but the legal framework supporting it is better in Thailand than in Indonesia owing to the TAO Act and the new Constitution (cf. Capistrano & Colfer 2005, 303). However, this worry hinders the government from taking the next step and enforcing the community forestry law and thereby extending the decentralisation process from tambon to community level. This step would be important for the forest communities, and it would better serve their needs, although joint efforts would still be required to find a balance between livelihood and conservation.

Decentralisation and involvement of people have many challenges left to overcome. At the community level, the possibilities for participation were, in general, in the present study still inadequate. A language barrier and the lack of education impeded participation. In particular, women encountered obstacles to participation (see also Griffen 2001, 85). In addition to the above mentioned, they faced the lack of time more often than men, and notions of women's place in society had an impact on their shyness, as Mairi Dupar and Nathan Badenoch (2002, 44) also reported. Nevertheless, possibilities for popular participation had recently increased as compared to the situation where the government had extended strict control to the northern upland areas after a relative autonomy of the communities there. This was largely due to the active role taken by the local people.

The results of this study, furthermore, suggest that success in sustainable forest management, if local communities were given more power in natural resource management, is independent of ethnic homogeneity or long-term social cohesion. This is consistent with the findings of Dupar and Badenoch (2002, 51), who state that those attributes (of homogeneity and social cohesion) are no prerequisite for benefiting from decentralisation.

Motivation for conservation

Success in decentralised natural resource management can be achieved when benefits accrue to local managers. This requires that decentralisation is a planned and negotiated process and includes transferring of assets, rights, power and entitlements to local managers in addition to responsibilities. (Sayer & Maginnis 2005a, 185). Consistent support to community-based management would further increase the villagers' motive both in the community supported and also the motive in other communities to become engaged (Mukamuri 2000, 30). A direct linkage between livelihoods and conservation provides an opportunity for local people to directly benefit from biodiversity and a healthy environment, and hence incentives for conservation. The present case showed, however, the prevalence of indirect linkages that provide alternative sources of income that substitute the previous benefits from the environment and a lack of linkage when conservation regulations were strict and excluded all livelihood activities. (Salafsky & Wollenberg 2000, 1422–5).

Based on the findings of this study, motivation and incentives for management, particularly conservation, are separated because both positive and negative factors of motivation could be identified and only the positive ones can be called incentives. In addition, motivation includes what can be called as conservation ethics, which Carol J. Pierce Colfer and Yvonne Byron define as "a theory or system of moral values pertaining to the planned management of a natural resource to prevent exploitation, destruction, or neglect" (Colfer & Byron 2001, 111). It is comprised of traditional beliefs and practices, the principle of preservation of

environmental balance, and conceptions of the significance of the forest (cf. Santasombat 2003, 182). This was a strong source of motivation for all the villagers interviewed. Traditions were important particularly in the remote Karen and Lawa villages, and the significance of the forest for people's lives was acknowledged in all villages studied as a reason to protect the forest environment. Thus, people were motivated for fire management because uncontrolled fire was understood as a threat to the forest. Reforestation initiatives, in contrast, were somewhat problematic because of the land use issues.

Secured property rights, as mentioned earlier, have been regarded as a significant incentive for sustainable forest management (Brown et al. 2005). These were largely missing from the study area, but an attempt to safeguard the rights to land motivated the management in the villages studied. Aspirations of upland minorities to legalise their status provides a strong motive also for changes if required (Dirksen 1997, 344). For example, the fear of losing farming land drove people to abandon the rotational system and to cultivate permanent fields instead. The forest was protected to ensure the right to stay in the area; to show that the villagers are capable of maintaining the forest. Another motive was an intention to prevent the extension of the national park to the village territory. The villagers wanted to prove that they were aware of the importance of conservation. The situation was similar with the one described by Chapika Sangkapitux et al., who observed in their study that the villagers continued with activities like growing of fruit trees and erosion control despite difficulties and lack of profitability because they wanted to show that they have environmental awareness. People hoped that by convincing the officials they could avoid relocation and be granted a citizenship. (Sangkapitux et al. 1999).

Another source of motivation is appreciation by the authorities of the local environmental literacy in forest management. The results indicate that the local people especially valued the practices that they had developed in the village and wished the officials also to understand that. In addition to highlighting their own capability in management, the people demonstrated that an important motivation was to save the forest for themselves and their future generations.

A practical application of forest management is the collaborative approach based on local environmental literacy that has also been applied in Thailand. In two projects, forest regeneration and rehabilitation were carried out using community-based management. The aim was that communities are involved as equal, joint-management partners. In both cases the forest cover increased as compared to the situation ten or thirty years earlier. Such results are possible only with active participation of the local people, sub-district authorities and the Royal Forest Department. (Poffenberger & McGean 1993; Griffen 2001, 87–88). If the projects, in addition, respect the environmental literacy of the forest dwellers and their practices that may have worked for generations, they help to maintain cultural features and the forest environment as well (Brown et al. 2005). Taking local environmental literacy as an integral part of adaptive co-management of the forest could, furthermore, promote empowerment (Berkes 2004, 629).

Participation has proved to be one of the best incentives for forest management. Arun Agrawal (2005, 162), for example, reports of an informant in an Indian village who expressed the motivation of the villagers to protect the forest in a way that also describes the situation in the upland villages investigated in the present study. The motivation for conservation arises from the products and services the forest provides. The villagers often have a greater motivation and thus ability to protect the forests than the government officials who are only doing their duty. Agrawal's research, moreover, shows that attitudes and practices can change. At the beginning, enforcement of restrictions on forest use and agriculture had made people to protest and ignore the rules and created mutual distrust between villagers and officials. However, bringing the forest administration with forest councils closer to the villagers returned a feeling of ownership. This, together with mutual interest in saving the forests from destruction, was a key to increased motivation for forest protection. Furthermore, the communities were given apart from responsibilities also benefits from the protected forests in the form of forest products. (Agrawal 2005)

The situation that prevailed at the beginning in the above-mentioned study in India has many resemblances with the present case in Thailand. The Indian example illustrates that the involvement of local people is likely to benefit the conservation aims rather than harm them. Mutual interest seemed to appear also in Thailand, but the devolvement of decision-making power was still in its infancy (Santasombat 2003). The process described by Agrawal in the Indian case is, anyhow, slow.

Economic incentives are the ones most often referred to when motivation of people is discussed. Alone they are insufficient, but they are a significant factor in decision-making, particularly as the villagers are increasingly involved in cash economies (Worah 2002, 82). For all stakeholders the economic incentives can have an important role in creating acceptance of conservation as a land use to be reckoned with (Kaarakka & Holmberg 1999, 48). In the present study area they, however, had a minor role. This is not to say that economic incentives could not be developed there. The most common means to create them in a protected area like the one now studied is through non-timber forest products. This would also require study on domestication options (Gansberghe 2004, 38–39). In any case, harvesting of non-timber forest products sustainably is problematic because the pressure is concentrated on only a few species and an attempt to increase the production may even have a negative impact on conservation (Salafsky & Wollenberg 2000, 1435). For successful management planning, it is important to conduct an inventory of forest products in which the local people are involved (Holmberg 1997).

Another potential source of economic incentives in the area studied, apart from forest products, was reforestation, which provided temporary employment. It should be further studied how the villagers could be increasingly involved in reforestation, starting from planning of which species to plant, so as to increase their motivation (cf. Griffen 2001, 82). In general, employment and small-business opportunities may function well as economic incentives (Kaarakka & Holmberg 1999, 47).

The question of incentives for sustainable natural resource management does not concern only the local people but also the central authorities. It is often the case that local people have stronger incentives to protect the biodiversity than do the authorities who have no personal contact to the area (Barrett et al. 2001, 499; Agrawal 2005). In the Thailand case the authorities have the central motivation to maintain the forest cover in order to prevent flooding and to secure the water availability for lowland farming. The pharmaceutical industry and international agreements may create national interests for biodiversity protection although the interests of citizens should always also be interests of authorities. This brings us back to the question of marginalisation of the upland minorities, who form a significant share of the population in many forest areas of the North.

In Thailand, much discussion has been going on about the capabilities of local communities to manage forests in a sustainable way. Lack of proper incentives, however, makes the question of capability irrelevant (Swinton et al. 2003). Moreover, motivation should arise from incentives; control should not be the only driving force for (decentralised) forest management (Capistrano & Colfer 2005, 311). The local benefits should, furthermore, be rather evenly distributed (cf. Sarin et al. 2003, 91). In addition, it should be recognised that perceived community benefits can be different from what is perceived by multiple stakeholders in communities (Berkes 2004, 627).

Conflicts over natural resources

Conflicts of various types sometimes arise because of power relations between groups. Those types of conflict that arise within communities or between neighbouring communities are usually solved with negotiations and are seldom serious (Santasombat 2003, 189-90). Some cases of dispute between uplanders and lowlanders, such as the one in Pa Kluay village described earlier, have received public attention, but rarely the cases are this severe.

In general, the use of agricultural chemicals, suspected deforestation and increased use of water resources in the uplands were reasons for such conflict situations. In the lowlands, and increasingly often also in the uplands, farmers are dependent on cash cropping, which causes conflicts over watershed and water use (Poffenberger 2000, 100–3). In addition, the migration of lowland Thais to the uplands induces tension over farming land (Ganjanapan 2000, 178).

In the villages studied some indications of this type of dispute between upland and lowland people were found, and it was caused by disagreement on forest resource use. An example of this type of a conflict occurred in the villages studied. This case, in which fire was used as an expression of opposition, was also reported by Henry Chan (2003). Resistance appeared among lowlanders because of a dispute over unclear borders and because of disagreement on forest use with an upland village. Although this conflict was resolved in negotiations between the communities, some lowlanders were unsatisfied and used fire as a means of opposition.

In the study area, the establishment and enlargement of national parks were the most significant sources of conflict between the government and local communities. As mentioned, the process of establishment had, however, become more participatory in a sense that the officials negotiated with the villagers more than before. Despite these negotiations, some villagers felt that the officials will follow their original plans and some implied that the negotiations had even elements of blackmailing (the officials were blamed for the type of argument: “If you refuse to give land, we will take it all”). In some villages within the Mae Tho area, plans to extend the national park increased the tension between the villagers and officials. The villagers wanted to keep the currently held lands which they categorised as their farming land including areas under fallow. This, furthermore, as reported by Robin Roth (2004a, 29), caused dispute also with the neighbouring village because the boundaries between villages were unclear.

The results indicated that a conflict over extending a national park can result in counter-reactions that cause encroachment of the forest. Farmers may want to expand their fields to the forest to show that it is used and because the forest under national park regulations could provide no source of livelihood for them.

Tensions can also occur between NGOs and local people, NGOs and the government or between NGOs. For example, the Care had been blamed by some villagers and other NGOs for close collaboration with the RFD, especially in stopping slash-and-burn farming. Conflict situations between NGOs and villagers seemed, in general, to be rare in the study area. Instead, dispute tends to occur between authorities and NGOs. In the establishment of Mae Tho National Park, for example, local forest officials blamed NGO staff for turning the villagers against the national park and authorities (Roth 2004a, 26). Furthermore, conflicts may take place also between NGOs and other stakeholders, such as people’s organisations. This may be the result when, for example, an organisation blames another for seeking only economic gains or administrative power.

Competition for land often causes conflicts between villages and with authorities, for example, because of mining activities. Insecurity over land resources has locally been a cause of conflicts. One reason for disputes over land is that laws and customary rights are often conflicting. In addition, controversies over inheritance have occurred after the government started to request for transferring land documents to title deeds but ignored many traditional systems. Inequality within a community also creates tensions. (Ganjanapan 1994, 615–20).

In addition, a possible source of conflicts underlies in the interests that market forces have in land resources, among the agro-industrial and mining companies, for example. These interests appeared also in the study area, but the villagers had avoided conflicts with companies at the time of the study. At the beginning of the 1990s, however, in the northern part of Mae Chaem a conflict between the villagers and the Forest Industry Organization (FIO) appeared when FIO intended to log a pine forest in the area, which was opposed by the local people. The villagers used the ceremony of tree ordination as a means of resistance and

ordained the whole pine forest. Thus, they used the ceremony for resisting government territorialization. Moreover, for the Hmong, for example, the ceremony has been one way to show that they care for the environment. (Isager & Ivarsson 2002).

Tools which the villagers used in conflict resolution combined new and old methods. Adapted traditional customs and informal negotiations were used, especially in conflicts within the communities. Local networks helped in conflict resolution between the communities but also with outsiders. Disputes with authorities or other outsiders, such as private companies or NGOs, could be resolved by negotiations, good working relations, coordination with outside agencies, or organisation of protest movements. (Santasombat 2003, 190–1). Community networks for watershed protection had been recently started in the area studied and little experience in problem solving existed yet, but elsewhere in the northern provinces community networks were reported to have started to solve disputes over land and forests (Rerkasem 2003, 338). In the study area, local networks seemed a promising way to prevent conflicts in the first place and also to resolve them if they occurred. The results also implied that clarity in boundaries, rights and responsibilities would diminish conflicts. Moreover, increasing participation (adaptive forest management) as well as promotion of local networks and cooperation would help to enhance mutual trust between ethnic groups at the local level and thereby prevent conflicts (Tan-Kim-Yong 2002, 6).

7.3 Terms and definitions in the discourse on upland people and the forests

Terms and definitions have been used in political discourse as tools to present each side's case in discussions on the forests and upland people. A case is the way the upland people have been called. In official policy, the status of the upland groups is changing from tribal people to ethnic minorities. While tribal people referred to quite a homogenous group living isolated from the state, ethnic minority connotes distinct ethnic background and a relation to and contact with other groups. (McCaskill 1997, 50). This term labels the upland groups as minorities as compared with the Thai majority but still contains some notion of homogeneity. Stereotypes have been created to distinct the upland minorities from the majority population (McCaskill 1997, 50). Dissatisfied with such labels the uplanders have often identified themselves as indigenous people. This has a political message that they use for seeking for more secure land rights and government help to uplift their standard of living. (Chiengthong 2003, 164).

The government has used terms such as *chao khao* (hill tribes) or *rai lu'an loy* (shifting cultivation) in the political discourse as instruments to express negative connotations and to show power relations. For example, the expression *rai lu'an loy* has been used as justification for defining all swiddening as harmful for the environment and therefore restricting agricultural practices and even upland settlement. As a response, the Karen have introduced the term *rai mun wiang* to differentiate the traditional cultivation system of the Karen and Lawa from other systems. (Laungaramsri 2002, 178–91; Santasombat 2004, 113–5). The purpose has been to highlight the rotational nature of *rai mun wiang* and its environmental friendliness as compared to shifting cultivation systems that require continuous clearing of new areas.

The Karen have wanted to obtain also scientific evidence of the sustainability of their farming system and bring this idea to the awareness of the government. For this purpose, Karen initiatives have included a field study by researches from the Chiang Mai University and publication of a book explaining thoroughly the traditional rotational farming system of the Karen and the cultural features interwoven with it. The Karen and also the Lawa tried to prove the sustainability of their management systems by highlighting that the remaining forests are located around their villages and to promote the idea that they are capable of harmonious co-existence with their environment. Many believed that if the government allowed them to continue swiddening, they would have much less problems with their livelihood. Thus, a confrontation between rotational farming and conservation appeared. This was expressed by some Karen and Lawa who wanted to continue traditional rotational farming instead of having the permanent farm plots and former fallows as protected forest.

One reason for conflict between government and forest dwellers is the ambiguity in definitions of forest. This ambiguity refers, on the one hand, to designation of forest in the law, which is based on lack of ownership and ignores the vegetation cover, and, on the other hand, to local people's definition of forest as "land with big trees" and deforested land as "open for common use". Consequently, logged-over areas have been settled. This has prevented the regeneration of the forest and also increased the pressure towards surrounding forest areas. (S. Ganjanapan 1998, 261; Kaosa-ard 2000, 6–7). Furthermore, the results of the present study indicated that, in addition to the definition of forest, it is important to recognise the differences in how deforestation and conservation are understood. This is particularly the case between slash-and-burn cultivators and officials as the discussion on *rai lu'an loy* and *rai mun wiang* also showed. A crucial point in defining conservation is whether it can include restricted use. In addition, different definitions of conservation may also have different emphasis: the government stresses the maintenance and increase of tree cover, whereas the forest dwellers regard the biodiversity of the forest area as a critical factor (see also S. Ganjanapan 1998). Such differing objectives are easily ignored unless the management is planned jointly.

Definitions can also function as an instrument of control. An example of this is categorising watershed forests into different classes of significance: giving the upland forests a primary status as conservation areas and at the same time defining the lowland forests as insignificant for watershed functions allows the government to strictly control the upland areas. (Laungaramsri 1999, 125). Moreover, the definition "hill tribes" by including connotations such as forest destroyers and disloyalty, provides reasoning for forest policy actions (Vandergeest 2003, 27).

7.4 Values of the forest – an important element of environmental literacy

Taking the local context – including the significance of the forest to local people – into consideration in forest management requires paying attention to four factors (cf. Wiersum 1999, 371–5). Firstly, the forest products gathered are an important aspect in forest management and also in agricultural management. Secondly, reckoning with cultural values and with differences between various groups is of concern when introducing new practices. Thirdly, different kinds of woody vegetation, such as natural forest types of varying condition, reforested areas, or trees planted on farms, require different management plans. Fourthly, it should be noted that practices, as well as objectives, vary, and locally applied practices of forest utilisation and maintenance, and regeneration of vegetation may differ from those employed by foresters. Thus, the values attributed to the forests may differ considerably; authorities, other outsiders and local people can have different, even contrasting views about the priorities and practices of management (Edmunds & Wollenberg 2003, 151). In addition, different views appear also within communities (e.g. Sarin et al. 2003, 71).

Various values can be classified according to four general categories of forest functions: regulation, carrier, production, spiritual and information values (cf. Wiersum 1999, 371). The non-economic values of the local people were a focus of this study, and in the following the findings are examined under these four categories. Economic values of the forest had a minor significance for the local people because strict rules of the protected areas inhibited marketing of forest products, employment opportunities were quite insignificant and basically limited to reforestation projects, and tourism was at the time still a minor activity although plans to promote it existed.

Regulation functions refer to the ecological services of the forest. The interviewees regarded particularly two of these functions as the most significant: maintenance of the water balance and a pleasant micro-climate. Discussions on the impact of the forest to water balance and rainfall have occurred in Thailand as elsewhere in the world. In Thailand, it is widely believed that forests generate rain (Kaosa-ard 2000, 12). This conception appeared also in the villages studied. From the scientific point of view, the impact of forest cover on precipitation is very

difficult to separate from other influencing factors, but no parallel evidence of its effect has been found although the forest vegetation creates a higher atmospheric humidity than grassland or agricultural non-tree crops (Bruijnzeel 2004, 187–8). However, Shinjiro Kanae et al., for example, found in their research in Thailand local effects of deforestation on precipitation in September when the monsoon south-westerlies were absent (Kanae et al. 2001).

In brief, different views exist, but the Thai government forest policy has its foundation on hydrological effects of deforestation. Therefore, the villagers had been educated about the importance of forest conservation to ensure water availability. Based on their own observations, the villagers were, however, uncertain whether the forests and rainfall or water availability were connected. A link between deforestation and floods seemed to be a less important issue for the villagers although it was brought up in some responses. The interviewees, anyhow, often stressed the forests impact on air humidity and soil moisture. All in all, the villagers tended to regard water as the most significant benefit of the forest (cf. Ylhäisi 2000, 208).

Another regulation function recognised was the ability of the forest to preserve soil fertility. Erosion was commonly considered only a minor problem in the area (see also Turkelboom & Van Keer 1996, 11–29). However, apart from the tree cover, plants with dense root systems were in general regarded to effectively control soil erosion, and this is considered to be even more effective than terracing (Rasmussen et al. 2000, 56). The traditional rotational farming system was regarded as free from erosion problems, but in permanent fields on hill slopes grasses were sometimes planted. People were aware of erosion and took precautions to prevent it (see also Forsyth 1996, 387).

A carrier function of the forest was also often referred to in the villages studied: the forest was regarded as a dwelling place for humans and animals (cf. Roth 2004b). Another important function was that it provided land for agriculture. These were considered as very important functions of the forest. The villagers generally viewed that the forest is necessary for their livelihood; the forest was regarded to as supporting life. This was also connected with the production function.

The production function of the forest is often associated with its economic value. A common assumption is that the conservation value should exceed the conversion value or otherwise the forest will disappear (Pearce 2001, 292). The economic significance of preserving forests may be difficult to measure, but non-timber forest products, including those most important for Thailand – bamboo, rattan, lac, gums, resins, mushrooms and medicinal plants[49] – and the fact that deforestation may alter radically the agricultural conditions, suggest that forests have an economic value also other than as sources of commercially valuable timber species (Sutthisrisinn & Noochdumrong 1998, 26–41). Under the current legislation, however, the local people lack the possibility to improve their livelihood by sale of non-wood forest products – and even more categorically, by sale of wood products.

For the people studied, the emphasis of the production function of the forest was rather on everyday needs than economic value. Forest products provided an insignificant source of income. This is consistent with Andrew Walker's finding that, in Mae Chaem, the forest products comprised less than ten per cent of the household subsistence and cash income (Walker 2004). The reasons seemed to include a poor availability of forest products, the emphasis on cash cropping, and the strict regulations on protected areas. Firewood, construction wood and edible products were the most important products of the forest (see also e.g. Mussanhane et al. 2000, 97; Vedeld et al. 2004). Especially firewood and construction wood were important because substitutes for them were difficult to find and they

[49] It should be noted that rubber, orchids, spices, silk and oil seeds are often regarded as agricultural products and hence excluded from non-wood forest products (Sutthisrisinn & Noochdumrong 1998, 27; Thai Forestry Sector Master Plan 1993b, 160).

were expensive to purchase. Food from the forest complemented the diet but constituted generally a minor share in it.

In contrast to what might be expected based on the common assumption of the Karen and the Lawa as traditional and the Hmong as business-oriented people, no significant differences could be noted between these groups in how much they gathered and used forest products (cf. Chiengthong 2003, 158). The lowland Thai also collected forest products. The differences, if apparent at all, seemed to be determined more by the sources of livelihood and the place of residence than the ethnic group. Cash cropping, for example, consumed more of people's time than the traditional farming systems and therefore people had now less time for off-farm activities. In addition, rotational farming ensured the availability of certain forest products close to village.

Gathering of non-timber forest products is often connected with the poorest people of the community (Dahal et al. 2000, 110). When tackling the problem of rural poverty, it is commonly expected that the income from forest products could equalise the local income distribution (Vedeld et al. 2004). In a way this could be applicable to Thailand: The upland minorities belong to the poorest groups of the country. At closer examination of the upland communities in the present study, however, the correlation between income and forest products seemed vague within the villages. Moreover, under the current legislation, cash income from forest products is an unfeasible option for the villagers and even the non-cash income was pretty insignificant in practice. Thus, it can be concluded that dependence on forest products had diminished with the introduction of cash crops, cash economy and an improved access to health services. However, forest products still played a significant role as additions to the daily diet, for handicrafts and, perhaps most importantly, as a source of fuel. Moreover, based on the results of the present study it can be argued that people who made their living in the uplands were largely dependent on the carrier and regulation values of the forest (cf. types of dependence by Salafsky & Wollenberg 2000, 1427).

In the present study, and consistent with the results of Anna Lawrence et al. (2000, 113) in Mount Cameroon, spiritual and aesthetic values of the forest were apparent. Spiritual values were reflected in rituals and taboos, including those regarding burial sites in the forest. Aesthetic aspects were expressed in the interviews in the villages by describing the beauty of the forest landscape but even more often this was highlighted in the responses of school students. Furthermore, the forest was regarded as affecting people's mood: the forest makes people feel happy, but without the forest they would become grumpy, basically because the temperature would be higher. In addition, the forest was perceived as contributing to people's health: in the area with forest cover, people thought they could stay healthy (see also Hull et al. 2001, 330). Moreover, recreational function of the forest was in some cases referred to in the context of tourism.

The information function of the forest is usually emphasised as a global value. In this study it also seemed to be of minor significance to local people as compared to other functions. However, some villagers highlighted this aspect. They suggested that it is important to save the forests for the future generations so that these could also learn about the forest and nature in general. In addition, learning from experience referred to the information function of the forest as well.

7.5 Environmental literacy on deforestation

Deforestation continues in Thailand despite the logging ban because the pressure on land and forest resources remains due to local and national-level demands. In the public discussion, agriculture has widely been viewed as the main reason for deforestation (Rerkasem 2003, 334). This was expressed also in the area studied. However, as explained previously, official and local explanations for deforestation varied to some extent. Although deforestation was a somewhat delicate issue, the villagers admitted that some clearing took place because of agriculture. Unlike the officials, however, the Karen and Lawa generally

regarded rotational cultivation as suitable for the forested upland environment which they inhabited and basically not as a cause of deforestation. Some villagers, on the other hand, expressed doubts about the viability of rotational cultivation. This view was probably affected by the government campaigns and the increased pressure on land resources. In general, it was indicated that an increased cultivation of cash crops, facilitated by the better roads, for example, may pose a threat to the forests (see also e.g. Delang 2002). The villagers mentioned the increasing needs for cash income, and some officials seemed to hold the opinion that people's "greed" makes them to expand their farms.

Despite the fact that agricultural expansion was viewed as a potential threat to the forests, several villagers and also many local officials concluded that deforestation was under control and no longer a major problem in the area. This was because logging was regarded as efficiently controlled. The villagers commonly referred to the logging by concessionaires while officials typically referred to illegal logging by the locals to expand their fields. The officials considered the clearing of new land for farming by the "hill tribe" migrants from the neighbouring countries as particularly difficult to control. It was understandable that a view of deforestation as a minor problem was presented to an outsider. Nevertheless, the villagers reported to have observed signs of degradation in the forest environment. Indicators of degradation included younger tree stands, a decreased availability of certain forest products and loss of wildlife (cf. Dearden 1997). In addition, abandonment of the rotational cultivation had changed the composition of the landscape, and even-aged stands in the forest provided fewer products for the villagers.

From the government point of view, the centrally controlled management has worked: swiddening has decreased, reforestation has converted former agricultural lands to forest, and conservation areas have increased in number and size. Thus, it is logical from this angle that the government is hesitant to transfer the power to the local level, not to mention to local communities. Those communities that have dwelled in the forests for generations, on the other hand, view it differently. The Karen and the Lawa, in particular, justify their capability for sustainable forest management by the fact that their villages are still surrounded by forest. For them, the outsiders – including companies, other communities, and even officials – were potential threats to the forests.

The other side of the coin of the centrally driven management is that such a policy may actually pose a threat to the forest. The establishment of a national park induces people to demarcate the conserved areas in the village territory, but, as the results showed, all forested areas, including the community forests, are subjected to become included in the park (see also Roth 2004a, 28). Therefore, also a clear disincentive for conservation exists for the villagers. In addition, the shortened fallow periods in the villages that still practiced rotational swiddening and declining yields have increased the pressure to clear more land, and only the fear of arrest prevents people from expanding their farms (Roth 2004a, 29). Similarly, cash cropping in permanent fields may fail if the farmers cannot afford to the commercial fertilisers and chemicals, and this increases the pressure to encroach the forest even more.

Consequences of deforestation, from the villagers' viewpoint, would be more than ecological and would comprehensively affect the social, cultural and economic spheres of their lives. Ultimately, deforestation would force people to move out from the region, probably to urban areas, or it would lead to relocation by authorities. From the government point of view, hydrological impacts of deforestation and watershed protection have played a key role in the justification of forest policy actions. Suspicions have, however, begun to rise also among officials that "the underlying assumptions about the impacts of upland agriculture on lowland water supplies are flawed or simplistic" (Forsyth 2005, 171). Despite this, the RFD still often assumes a link between the two. Moreover, the idea of this link has also been supported by the military who regards control of the uplands as important for national security and by lowlanders who may be reluctant to reduce their water use. (Forsyth 2005, 171, 174). Regardless of this discussion about hydrological impacts of deforestation on the lowlands, it is, however, likely that the upland forest dwellers, whose survival and legitimacy to stay in

protected forests is dependent on the forest, are those who most concretely would suffer from the impacts of upland deforestation.

Connections between poverty and environmental degradation

The impact of poverty on deforestation, and on environmental degradation in general, has been widely discussed. Poverty has been regarded as causing deforestation (Grainger 1993, 52–53; Lombardini 1994; Rudel & Roper 1997; Geist & Lambin 2001). The predominant argument has been that the reason why people degrade their environment has not primarily been the lack of environmental literacy (excluding perhaps the case of migrant farmers), but the external forces that make them exploit resources for short-term survival without possibility for conservation (Leeuwen 1998, 10–11; see also e.g. Myers 1994; Henkemans et al. 2000). However, poverty as a driving force for environmentally unsound practices has recently been questioned. Two aspects interesting from the point of view of the present study have particularly appeared in the recent discussion: whether the land use practices of the poor really are causing environmental degradation, and whether the need for income or other livelihood assets is to blame. The link between poverty and the environment is, however, far from straight-forward and further complicated by the varying definitions of poverty. In this case study, the fact that the upland minorities of the North are among the poorest in Thailand but live in the last remaining forest areas seems to poorly support a correlation between poverty and environmental degradation. On the other hand, poverty and deforestation are linked through underlying factors (Geist & Lambin 2001, 72–73).

The connection between land use practices, wealth, and environmental degradation was studied by William G. Moseley in Mali, Africa. The results showed no evidence of less sustainable soil management by poor households (Moseley 2005). Studies in Latin America have ended up with similar results about the non-existent correlation between poverty and degradation and found that both the poor and non-poor were causing degradation of natural resources (Ravnborg 2003; Swinton & Quiroz 2003). On the other hand, Scott M. Swinton and Roberto Quiroz found in their study in Peruvian Altiplano that deforestation and poverty had a link through the use of firewood (Swinton & Quiroz 2003). A reverse link was found by Helle Munk Ravnborg who reported that in the Nicaraguan hillsides the less poor and non-poor were the main agents of logging of construction material and firewood for sale because they had better access to the forest and transportation facilities than the poor (Ravnborg 2003). In general, deforestation and forest degradation have been viewed to result from the lack of income-generating alternatives (Brown et al. 2005). As the case of this study illustrated, an increasing need for cash income puts pressure on expanding the farms even at the expense of the forest. Market incentives to clear land are one factor threatening the forests. The case of north-eastern Thailand is also an illustration of such relationships.

Apart from poverty, a wide term marginalisation has been explained to lead to environmental degradation (Robbins 2004, 76–77; see Blaikie & Brookfield 1987). When poverty, landlessness and insecurity of land and citizenship drive people to seek new lands in higher up in a mountainous region for clearing and cultivating, marginalisation can be argued to contribute to environmental degradation (Ganjanapan 2000, 179). However, the results of the present study did not quite support the explanation of marginalisation as a major cause of degradation, as the minority people, who are commonly regarded as marginalised, showed willingness and capability for conservation. In any case, the interdependence of causes and effects of environmental degradation are complicated, which makes it difficult to determine the impact of marginalisation. Furthermore, an aspect related to forests and poverty that is more often emphasised is how the forest resources could help in poverty reduction (e.g. Oksanen et al. 2003). Forests function as safety nets for their inhabitants but can also turn into poverty traps if no livelihood-supporting activities are permitted (cf. Arnold 2002).

7.6 Management for conservation and environmental literacy

In general, two contradictory viewpoints on forest management and related local environmental literacy exist, one of the officials and another of the forest dwellers. The local people, as this study demonstrated, tended to regard themselves as capable of managing their surrounding forests and only requiring some help from authorities in controlling and policing, primarily in response to threats from outside the community. A supporting argument presented is that communal systems of natural resource management have existed for centuries (Poffenberger & McGean 1993). The main justifications of claims to community-based management that appeared in the villages of the present study were based on efforts made in forest protection and on dependence on forest in terms of livelihood, while also the state authority was recognised (cf. Edmunds & Wollenberg 2003, 157). The government, in contrast, continued to regard the forest dwellers and particularly the minority groups as a problem and seemed to lack confidence that those actors could manage the forests by themselves without rigid control. Therefore, the government is hesitant to give the communities a decision-making power in management because of the fear that under the control by villagers the forests would vanish.

The perception that, if given the control, the forest dwellers would exploit the forest in a way which leads to degradation and forest loss is underlying many projects. The projects targeted for settlers in the forest areas have often started from an assumption that these people need information to increase their environmental awareness and their attitudes need to be changed. For example, the Mae Chaem Watershed Development Project reported people's change in attitudes related to absorbing new knowledge as an achievement of the project (Ministry of Agriculture and Cooperatives 1988). A further assumption, as the interviews with officials indicated, has been that the villagers need to be assured of the significance of the forest and the importance of conservation. However, the results also showed that the villagers themselves seldom wished to receive this type of information, although they may have suspected that others in the community or more likely in adjacent communities might need that kind of education. Instead, they preferred information on forest products and, above all, on alternative options for livelihood. Women sometimes felt that they lack knowledge on laws, administration, and objectives of the RFD (cf. Griffen 2001, 85). The information from the outside was not absorbed without consideration: the interviewees indicated that it was first discussed among the villagers and then adopted if applicable.

The villagers were motivated for natural resource conservation, as discussed earlier, because they felt that their livelihood is interconnected with the forest and also because they could affect their environment with their own behaviour (cf. Enters & Anderson 2000, 173). Benchaphun Ekasingh et al. (2001) also imply in their study that farmers seem to be well aware of the environmental risks on the one hand, and of conservation on the other. Furthermore, training and education contribute to environmental literacy of the villagers and, for example, Benchaphun Ekasingh with her colleagues suggests that the villager information on soil conservation was derived from the training offered by the Royal Project and officials (Ekasingh et al. 2001). When examining environmental literacy, a question, anyhow, remains to what extent the villagers just repeat ideas from these training events because they think it is expected. On the other hand, as they had moved from active natural resource management to a more passive one after the increased involvement of the state (cf. Yadav et al. 2003, 42), the role of their own environmental literacy may have decreased.

As indicated by its definition, environmental literacy is a synthesis of ingredients from many sources, and it is regarded as unfruitful to define whether knowledge is 'traditional' or 'scientific' or something else. Furthermore, discrepancies that may appear between villagers' observations and scientific findings, such as those related to decreased water flows (cf. FAO 2005a), are actually of minor relevance in an attempt to find the best practices of forest management. A forest management viewpoint stresses the practical aspects of environmental literacy and, therefore, the emphasis is on practical applications that emerge from those diverse ingredients. Distinctions were, however, made by the people now studied. They made a distinction between information from outside and that based on traditions or own

experience. Conservation, for instance, was often perceived as something on which the information came from the outside whereby the traditional ways of natural resource management that protected the forest were easily excluded.

Environmental literacy related to forests is typically assumed to lead to sustainable practices and conservation. This may, however, not necessarily to be the case (Enters & Anderson 2000, 171–4). Traditional beliefs, for instance, may sometimes lead to loss of species (Becker & Ghimire 2003). Furthermore, changing conditions may make formerly sustainable practices unsustainable (Sierra 1999). In addition, when striving for integrating environmental literacy with forest management, it should be taken into account that the environmental literacy on forest and its management continuously changes and adapts to new conditions, which also is shown by the present results. This adaptation quality can affect, apart from the management practices, also on the dealing with power relations. An example of this is how the local people have absorbed new technology, such as the use of aerial photographs or satellite images, for negotiations with authorities (Santasombat 2004, 118).

7.7 Considerations on forests and ethnic minority people of northern Thailand

Three tendencies in the government attitude towards the upland minorities seemed to appear. Firstly, these groups were regarded as a problem. Secondly, the uplanders were viewed differently from lowlanders and according to their ethnic group, for example, different attitude prevailed towards the Karen and the Hmong. Thirdly, these minorities were often in political decisions lumped together as a homogenous group although their heterogeneity is apparent and their land use systems vary (Tomforde 2003). Differing definitions on what conservation means and differing motivations for conservation at the local and national levels exacerbate communication, which is also observable in the long process of preparation of the Community Forestry Bill.

A report of the Mae Chaem Watershed Development Project, for instance, reflects the relations between the government and upland ethnic minorities that prevailed in the 1980s and to some extent also prevail today: “Remote hill tribe villages, which in the past grew more opium poppy and had high rates of opium addiction, have begun to change their attitudes and attempted to raise their living standards and reduce their vices (especially the Karen and Lawa)” (Ministry of Agriculture and Cooperatives 1988, 30). This report suggested promises for cooperation between the government and the Karen and Lawa, who were still regarded as easier to work with than the Hmong. All the communities studied, however, had at least some cooperation with authorities. The government’s goal to promote the integration of the minority groups into society and, at the same time, the growing aspirations of the upland people are also noticeable in the project report: “They now want more schools for their children, more roads for village access, clean water systems, health and other facilities. […] The hill tribes are more and more following the Thai model, such as in the construction of more permanent houses, change of agricultural practices, participation in meetings, and joint Thai-hill tribe community development activities” (Ministry of Agriculture and Cooperatives 1988, 30).

A notion of uplanders as agents of deforestation and as possibly disloyal to the Thai state still exists widely (Delang 2002). It can be concluded that in the past upland swidden agriculture was viewed as causing waste of potential timber resources, but with a change of the policy focus towards conservation it was gradually viewed as a threat to valuable biodiversity and water balance (cf. Myllyntaus et al. 2002). These notions have also been used in the community forest debate (Buergin 2000, 6). However, different views have increasingly begun appear: upland forest dwellers are also regarded as living in the harmony with nature and possessing valuable knowledge of their environment (Buergin 2003, 388). The interviews of officials conducted in this study also suggested some mitigation in the views towards ethnic minorities dwelling in forested uplands (see also Walker 2004). The heterogeneity of these people was also often recognised. However, negative attitudes and distrust, particularly on the Hmong but also on "hill tribes" in general, could be found among the officials. In particular,

the business orientation of the Hmong was considered as a reason of conflicts because of the existing higher demands on productivity and land.

Stereotypes of ethnic groups, both positive and negative, also have their basis on some academic studies (Chiengthong 2003, 159). For example, Dr Anan Ganjanapan from the Chiang Mai University describes the Hmong as still largely being migrants who "are not likely to preserve the forest area where they temporarily live" (Ganjanapan 2000, 173). This notion of the Hmong as people who exploit the forest and disregard the consequences of deforestation has, furthermore, justified development interventions by the government and NGOs. This resembles the situation that Anja Nygren reports to have appeared among local settlers in Río San Juan in Nicaragua (Nygren 2004, 195–7). In both cases, development interventions were thought to also require raising of environmental awareness.

The Karen and the Lawa, in contrast, have increasingly often been subjected to such positive views as mentioned earlier. These views label them as conservation-oriented and easy to cooperate with. The Karen themselves have contributed to these perceptions and actively boosted the positive sides of their image, which was also reflected in the interviews. They want to strengthen their identification as the children of the forest who possess the environmental literacy derived from the complex systems of natural resource management. This has been a means for the Karen of advocating their rights in the rivalry over the land and forest resources (Santasombat 2004, 113–6). Furthermore, NGOs and academics have contributed to this image. For example, the Karen have a proverb that has often been quoted – "Live with the water, care for the river – live with the trees, care for the forest" (Trakansuphakon 2001, 121) – that has been used to illustrate the conservation orientation of the Karen. On the other hand, it could be argued that in the discussion on community forestry the Karen way of living with nature has been presented selectively and even romanticised (Walker 2001; Forsyth 2005, 174).

Another common perception of the Karen has been a notion of traditionally subsistence-oriented people, which they also themselves have tended to emphasise, as the results implied. This notion has, however, been questioned, and it has been suggested that it could be only a recent trend among the Karen that is again changing. Paddies are increasingly important also for the Karen and cash cropping has increased while rice has become a relatively minor crop. (Walker 2001, 154–7). This tendency for change in agricultural crops and increasing market orientation was also noticeable in the study area. Subsistence use of the forest, however, prevailed in the Karen but also in the other upland communities. The reasons for this became evident as explained, and forest products were collected mainly for household use. Anyhow, notions of subsistence and conservation orientation linked with traditionalism provide a useful instrument for the Karen in negotiations with the government regarding their rights to land and forest (Walker 2001; Santasombat 2004).

The Karen have a further advantage apart from their image as nature care-takers in the community forestry discussion: They are more readily regarded as indigenous people who are by definition associated with sustainable resource management. The Hmong, instead, are viewed as non-indigenous migrants whose understanding of environmentally sound practices is inadequate. The Hmong, however, had also tried to construct an improved image and adapted to the requirements of conservation areas and sedentary farming. (cf. Nygren 2004). For example, in Chomthong, the Hmong were reported as attempting to minimise the effects of their activities on the watershed (Poffenberger 2000, 101). In addition, when protecting the forest, the Hmong have seen the positive impacts of conservation of which not the least has been decreased number of conflicts with authorities (Tomforde 2003).

Despite their efforts, the Hmong have suffered from and still bear a burden of a negative public image. The focus of public accusations has changed from the Hmong being opium growers and pioneer shifting cultivators, because these practices has largely been rooted out, to blaming them for resistance to Thai culture and the Thai state. In addition, earlier allegations of illegal immigration, drug trafficking and destruction of watershed areas still prevail as well. This image has raised a counter movement among the Hmong, who have

attempted to create an image as Thai nationals respecting Thai values. (Hengsuwan 2003, 16–17).

While the Karen and the Lawa have been regarded as having traditions in conservation, the Hmong have widely been believed to lack conservation values and strategies in their traditions (Tomforde 2003, 358). The results of this study, however, disagreed with this thinking. The Hmong traditions appeared to include many ways to protect the forest and showed willingness to care for the environment by the same token with those of the Karen and the Lawa. This is consistent with a recent study by Paiboon Hengsuwan (2003). Furthermore, Yang Congming (2003) describes the importance of trees to a Hmong community in China; tree planting was a regular activity in the village. Old trees around the village were thought to accommodate spirits and protect the village and were therefore protected. The Hmong in that village regarded the trees as equal to humans. (Congming 2003, 124–5). This seems to illustrate that also the Hmong have features in their tradition that lead to protecting the forest.

This discussion illustrates that stereotypes are created by all stakeholders, and minorities try to influence the images that are created of them. A vigorous promotion of forest-friendly upland groups seems to some extent have succeeded in creating an atmosphere that favours seeking alternatives to relocation of communities. This, however, only appears to relate some groups regarded as conservationist and non-commercial. (Walker 2004). All in all, images are purposely created among all groups including the authorities, both with positive and negative connotations, and these images tend to have certain objectives in the background. The villagers, for example, have used narratives of corruption and misdeeds in the RFD as a means of compromising their authority and ability to manage forests (Roth 2004a, 27).

The results of the present study do not support a general assumption that the Karen and the Lawa are more concerned of the state of the forests than the Hmong. The attitudes of the Thai were not considered as an issue but those of the upland dwelling minority groups were – despite numerous cases in which the upland minorities have actually blamed the Thai for destroying the environment. Although the sample was too small for any large-scale comparison, some cautious conclusions can be drawn concerning the study area. In this area, no noticeable difference in opinions or stance regarding conservation seemed to appear between ethnic groups, at least no longer. The villagers agreed with the government on the significance of protecting the forests although views on the best procedure differed. Forest dwellers commonly have their own traditions for conserving the forest, but an increasing pressure on land, among other things, is forcing them to develop new strategies for conservation also at the community level. New forest management practices mixed with the traditional ones had already been adopted in the study area, but a need for closer cooperation and improved participation in the communities still existed.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 Central questions and challenges in near-future forest policy

The central issues in Thailand's forest policy regarding natural forests seem to focus around the questions on how to respond to the root causes of deforestation and maintain the forest cover as well as on how to organise the forest management at the local level and resolve the problems related to a community forestry law. A decentralisation process has started, and the role of public participation is increasingly acknowledged in the forest policy, but challenges remain in how to advance these developments and to what extent the devolution of forest management is necessary down to the tambon and community levels. A further problem is the tangled legislative situation with contradictory laws, regulations and practices, and the insecurity of the local people in the absence of a community forestry law. Moreover, the questions of lacking citizenship and land use rights of the upland minorities await some solution.

One of the first challenges is to overcome the constraints in joint forest management at administrative levels. One is the lack of mutual trust between the upland minority people and officials. Forging a relationship based on trust is essential for a true dialogue, which, furthermore, is the way to find a consensus in solutions that are needed for sustainable forest management. This dialogue should take place between all stakeholders and be a continuous process, just as the planning of forest management should be so as to be able to adapt to constantly changing conditions. In addition, a great challenge to natural resource management is that diverse areas that vary in their ecological, socio-economic or cultural characteristics are likely to need context-specific plans. Decentralisation and improved people's participation would help in designing management strategies for differing areas. Participation can also be expected to promote a real dialogue that is necessary in efforts to build mutual trust.

It seems evident that more dialogue is needed to find a sustainable solution for the problem that is preventing a community forestry law from being enforced: a compromise needs to be found between total exclusion of people from the forest and limitless use. The task is to find limits for an acceptable level of utilisation and to define the forest areas where use is allowed. This includes the issue of preserving the cultural diversity along with the biological one.

8.2 Recommendations and needs for further study

One of the burning issues in upland policy is the question of agriculture and its need for intensification of land use. As a consequence of changes in land use, for example, an expansion of protected areas, the utilisable land area has shrunk, which together with the increasing demand for land has led to new problems in land use. Hence, local farmers increasingly face the strain to intensify their land use. The situation is that the upland farmers currently encounter many problems in changing their cultivation system from swiddening to permanent fields. Therefore, they are looking for new farming systems and crops. Intensification of land use on current agricultural land is also a goal for the government because that would decrease the pressure on forest land. In brief, new viable farming systems that are ecologically, economically and culturally sound are needed as a response to the requirements of intensification in upland agriculture. As part of the farming systems, new appropriate alternatives to upland crops are required as well.

When exploring new strategies, the environmental literacy related to traditional farming systems should not be ignored. A suitable approach would be to look for solutions in agroforestry systems. Although agroforestry was not widely practised in the villages at the time of the study, apart from some attempts with fruit trees, many agroforestry systems have been successfully applied also in Thailand. Traditional agroforestry strategies have a potential to meet, in addition to the basic needs, many ecological, economic and even social ones. Further study is warranted as how to apply these local strategies. This includes, as an

important detail of investigation, a question how to overcome the problems of the law prohibiting the use of wood in conservation areas. Similarly, studies are needed on the effect small field size typical in upland farms on agroforestry practices. Land right issues are also crucial in this context. Nevertheless, it would be worth further investigation to clarify whether agroforestry in this area could provide alternative farming methods at least for some farmers and an additional way to protect the forests.

Two aspects of sustainable forest management are of central importance: the involvement of local people and incentives. Proper incentives are needed to promote sustainable practices. These should be positive spurs, that is social, economic and ecological benefits for the local forest managers instead of negative sources of motivation such as the fear of losing land or of relocation. Benefits should, furthermore, be distributed evenly. Adequate incentives at the first stage would possibly be a permission to use non-timber forest products and harvest timber for household construction. It is, however, probable that with time economic benefits will also be expected by the communities. It would be important to investigate and develop the appropriate incentives using participatory approach. Furthermore, it is essential that local people can consider conservation as meaningful and sensible, instead of merely as obeying laws (cf. Harada 2003, 279–80).

Non-timber forest products provide non-economic benefits, but they could also potentially become a more important source of additional income in the upland villages. This would, however, require definition of the level at which sustainable use is possible. A challenge from the conservation point of view is how the activities providing economic benefits, such as the selling of non-timber forest products, (eco-)tourism, or cash cropping, could be managed in an ecologically sustainable way. To ensure sustainability in utilisation in the case of some forest products, a solution could be domestication (i.e. introduction to cultivation), which, however, needs to be studied further. Moreover, when exploring economic benefits from non-timber forest products, it has to be also noted that the forest products with commercial potential may be different from those needed by the local people.

Motivation is important for the sustainability of forest management but criteria and indicators to monitor the realisation of sustainability are also needed. These should be defined in a participatory process, and they require constant revision and re-evaluation. Participation of the local people also helps to ensure that a balance between livelihood and management goals can be found. The focus when developing participatory practices should be on providing equal opportunities for different groups including the women. Bringing participation to the community level requires decentralisation. Planning and preparation are essential and important steps of decentralisation, and these by no means imply exclusion of the central administration which is needed in decisions on larger-scale issues in conservation. For the government, development of a participatory approach means that instead of regarding the upland groups as a problem they should rather be viewed as partners – after all, both seem to share the goal of saving the forests. In addition to the efforts to improve the cooperation between the local people and authorities, the cooperation among communities should be further promoted. In the present study, it appeared as a promising way to address the local conflicts, and it would also help the communities in their negotiations with authorities.

8.3 Environmental literacy in finding the ways to sustainable forest management

The case covered by this study demonstrated that motivation for conservation exists at the local level among different ethnic groups although the sources of motivation may vary. Motivation originates in culture and traditions on one hand, and in pressures from outside on the other. Making community-based forest management sustainable in protected areas is still a complex issue. This study emphasised context-specificity in the gaining of sustainability in areas where people live and make their livelihood in or with close connection to the forest, particularly protected areas. Management systems should be culturally sensitive and adaptable to local socio-economic conditions.

The heterogeneity of communities should not, on the other hand, be overemphasised to let it hinder the application of new strategies and approaches. Truly community-based natural resource management should be able to adapt to the needs of different communities. Instead of putting the emphasis on differences between ethnic groups – even if they are obvious when the groups are linguistically and culturally diverse and have different traditions in natural resource management – the common interests should be highlighted: the forest is valued as significant for maintaining the livelihood. In the present study, the villagers largely shared this view, which is a good basis for collaboration. Different traditions can to be integrated into new management schemes, as the present results indicated, although adaptation is required and certain restrictions, for instance, on slash-and-burn cultivation are inevitable. Giving authority to local people ensures that they have a possibility to incorporate values they regard important for management practices. Furthermore, the capability and willingness of the people to adapt to new conditions and requirements and to change their ways of action illustrated by the case of the Hmong now studied should be recognised.

Traditionally, large-scale forest management in tropical countries has emphasised natural conditions and the actions taken by the government or the private sector, but it has increasingly been recognised that taking into account the diverse groups of people who reside and make their living in or adjacent to the forest areas is also important for achieving sustainable forest management. Previous studies have often emphasised differences between ethnic groups in natural resource management and even presented a dichotomisation between malign and benign practices. This study, however, illustrated that the heterogeneity of the population in a forest area is no major obstacle for successful community-based management, successful referring here to meeting the objectives of the local people and the government. Despite some conflicts, the local cooperation among communities and ethnic groups seemed to already have a good basis, whereas cooperation between local communities and the government needs to be improved.

Local initiatives are crucial in community forest management. Environmental literacy, when understood in a broad sense as in this study including apart from environmental knowledge and practices also the attitudes, objectives and interests, can provide a good instrument for improving the involvement of local people in natural resource management and contribute to the sustainability of management strategies. A sustainable community-based management is feasible and realistic in upland areas with ethnic minorities; after all, a community forestry law, decentralisation extended to the community level, or another tool to secure favourable conditions for the communities to manage their forests is needed.

The present case of upland villages in northern Thailand showed that people are willing to change and adapt their systems if their livelihood is secured, and they are also motivated for conservation. With proper incentives and a proper level of involvement, the prospects for community-based forest management seem promising. Community forestry would be particularly necessary for the protected areas: it would promote conservation efforts if the principles of collaborative adaptive management were respected and if the livelihood options in the upland villages were enabled to the extent that alternatives to forest encroachment existed. In protected forests it is fundamental to find options for people and forests to co-exist without threatening the conservation goals or people's welfare. It is a challenge to find these possibilities but it basically seems to be a matter of dialogue, joint effort, and political will.

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List of interviews

Interviews in the villages

Ban Lau:	13 individual interviews	2 group interviews
Ban Yang San:	14 individual interviews	6 group interviews
Ban Pang Hin Fon:	10 individual interviews	2 group interviews
Ban Ho:	13 individual interviews	3 group interviews
Mae Ya Noi:	15 individual interviews	3 group interviews
Ban Phui:	8 individual interviews	3 group interviews
Huay Kiper	1 individual interview	
Huay Bong	1 individual interview	
Ban Phui Tai	1 individual interview	3 group interviews
Sedusá	1 individual interview	
Ban Yang Luang		1 group interview

Interviews in Rajpacha boarding school

Matayom grade 5: 24 individual responses, 3 group responses
Matayom grade 3: 3 group responses

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Interviews of academics

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Other interviews

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APPENDIX – Questionnaire for individual interviews

Questionnaire number
Date
Interpreter
Village, District, Sub-district
Ethnic group

1) Interviewee: Name
a) Sex (F=female, M=male)
b) Age
c) Education
d) Occupation
e) Religion
[f) Citizenship]

2) Household
a) What is the total number of household members? How many adults (men/women), children (boys/girls)?

b) What is the size of your farm/ the land you are cultivating?

c) Do you own the land you are cultivating? If not, please explain.

d) What do you grow in your farm? Do you plant trees, and, if yes, for what purpose?

e) Please explain your farming systems. (E.g. Do you practise slash-and-burn cultivation? Agroforestry i.e. plant trees and other crops in the same plot?)

f) What is the income of your household per year? (From farming and from other sources?*) Do you sell forest products? (How many percent of your income comes from forest products?)

g) Are you a migrant in here? If yes, from where did you migrate, and for how long ago?

h) Do you participate in some forestry or agricultural programme/project? Please explain. Does it include training or education or extension services? If yes, what kind of?

Forests and their management
3*) What is a healthy or good forest like?

4) Can you describe what type of forest there is in this area? What are the main (characteristic) species?

5) What are you using the forest for? What kind of activities do you practise in forest?

6) What does the forest mean to you?

7 a*) In your view, what changes, if any, have taken place in the environment in this area since you settled here/ you were a child? Have there been any changes in forest area or quality? What are the reasons?

[b) Have you used some special strategies to cope with changing conditions?]

8) What are/would be the environmental consequences of forest loss in this area?

10) Do you yourself do something to protect forest? Please explain.

11*) Do you think people in this village or neighbouring villages could do more to protect environment? Please explain. (Is there illegal logging in this area – if yes, why do people do it?)

12*) What are the benefits and disadvantages of the forest conservation areas? Please explain.

13) How, in your opinion, could the forests be used in a sustainable way (ensuring people's livelihood without disturbing ecological balance)?

14) Could you manage without forest? Please explain.

15a*) What products do you collect from nature (products of trees/plants/animals) and for what purpose? Where do you get them?
b*) How big share of your diet consists of forest products?
c*) How big share of all fuel used in the household is wood?
d) What tree species are used and for what purpose?

16) Have there been any changes in the availability of the forest products? What kind of?

17 a) What do you consider as the main environmental concerns in this area and why?

b) If there are concerns, what could be the solution in your opinion? Do you have suggestions?

18) Are you satisfied with the current way of managing the forests? If not, please explain.

19*) Did the logging ban in 2532 (1989) affect you or other people in this village?

20*) Could you say that the forest is valuable in itself? Please explain your view.

21*) From where and how you and other people in this village learn about forests and environment?

22*) Does knowledge of environment differ between various groups?

23*) What would be the best way to inform a) men and b) women about environmental issues?

24 a) In your opinion, how well elder men and women in this village know different species in the forest?
men: very well/ well/ poorly women: very well/ well/ poorly

b) How about boys and girls of this village? boys: very well/ well/ poorly girls: very well/ well/ poorly

c*) Do you consider this kind of knowledge useful? If not, what kind of knowledge would be useful? For what reason?

Other information

Others present during the interview (relation to household, sex, age)

(* Changes or modifications made during the fieldwork)